April 1987

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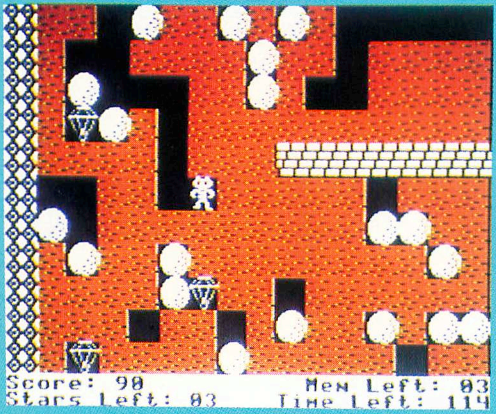
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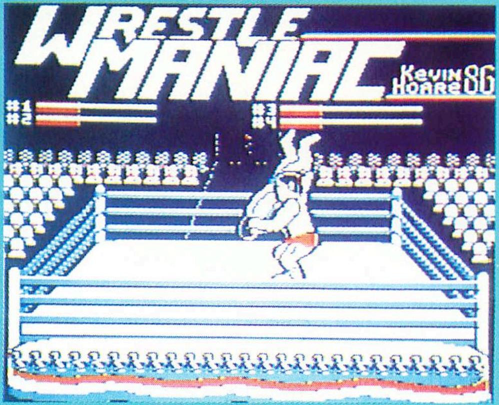
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Kevin Hoare 86
#1
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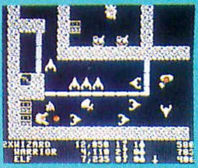
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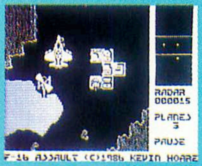
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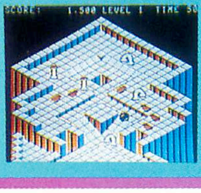
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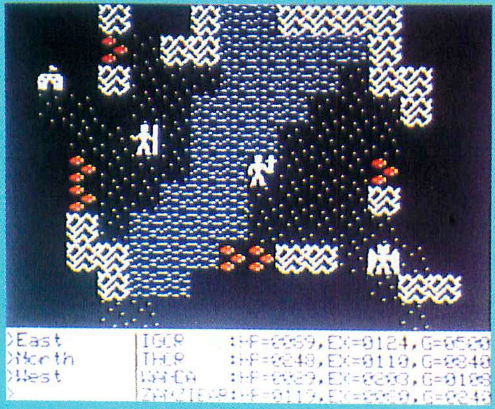
>East
>North
>West
>
IGOR :HP=0059,EX=0124,G=0500
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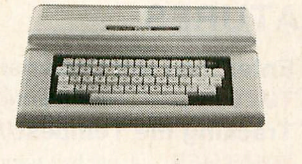

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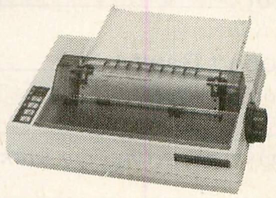

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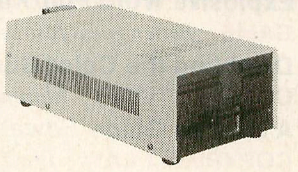

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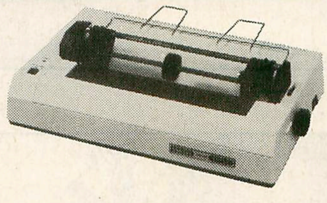

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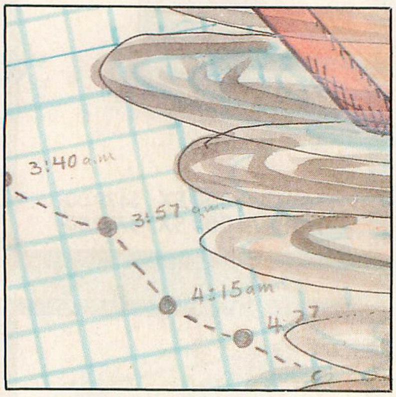
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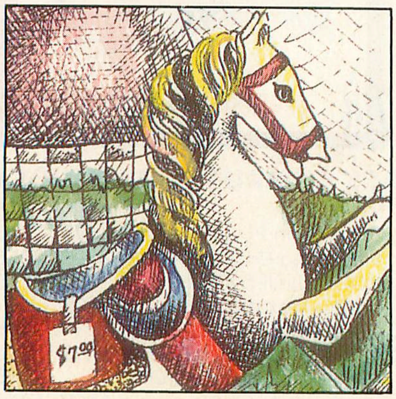
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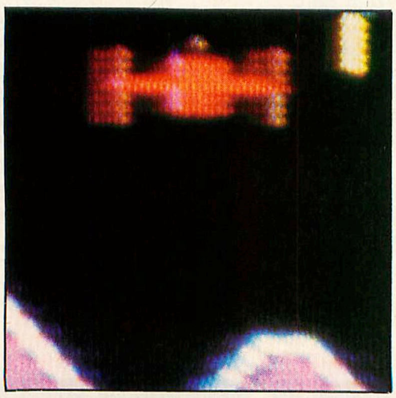
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NEXT MONTH: Screen dumps, graphics, dot matrix, cpi, near letter-quality, parallel, serial . . . . If these things set your mind a-whirl, then check out our May Printer issue. We uncover the mysteries of that indispensable peripheral and highlight its many capabilities. And, as usual, May's issue will be packed full of useful and interesting programs, utilities, games, reviews and much more!

Discover the power of the printed word — discover THE RAINBOW, the best information source for your Color Computer 1, 2 and 3!

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April 1987 Vol. VI No. 9

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LETTERS TO THE RAINBOW

Some New Tricks from the Rainbow Trainer

Editor:

I think RAINBOW can teach an old dog new tricks. I'll be 73 this year and purchased a computer after I retired. I'm too old to learn programming but the information in RAINBOW shows me how to come up with a program I would like to write.

In the December 1986 issue [Page 62], Ilene Fortin's program showed me how to make a card. In the December 1985 issue, Chuck Hawley [Page 7] wrote a screen dump program in his "Letter to the Editor." Put them together with graphics drawn in Old English and I think you can have a cute program for any type of card you wish to make. I save my programs on tape and add a new name when necessary.

Retired people seem to be afraid to try playing with a computer. It's a whole new world and is a great help for keeping the mind alert.

Charles F. Muisener
Newington, CT

It All Crashes

Editor:

I'm interested in hearing from anyone who was able to get the program *CONVERT.64K* by Jorge Mir in the October 1983 issue [Page 317] to work. I have a CoCo 2 ECB that I upgraded to 64K. Everything works fine after I run the program until I try to make an entry, then all crashes. If you can help me, please write.

JoAnn Karaffa
220 Card Avenue
3rd Floor
Wilmerding, PA 15148

New Kid on the Block

Editor:

The January 1987 columns from Lonnie Falk and Jim Reed were excellent. When something decidedly better comes along (like the CoCo 3) I also want it. Retiring the old gray CoCo will be difficult, but I'll soon be doing it.

Jim's article on meeting the CoCo 3 challenge was also very good, but I have a few reservations about the enthusiasm of a few of your advertisers. My hat is off to advertisers like J&M Systems LTD, Spectrum Projects and others for ads that address the CoCo 3. There's a new kid on the block out there called CoCo 3 — it's time for the ads to reflect which model computer their product is for and discuss compatibility. I'm sure that there are a lot of hackers out there who will be joining the challenge to solve some of these third party incompatibility problems. In the meantime, advertisers should update their ads so potential customers are given more answers than questions.

Roger Rosenquist
Southborough, MA 01772

Public Domain Reviews

Editor:

I have been a reader and fan of RAINBOW for four years. It has been indispensable for me.

Why don't you have any reviews of public domain software in RAINBOW? This would be of great value to your readers and to all Delphi/CoCo members.

Chuck Silver
Portland, ME

Two reasons: First, we feel that the primary purpose of our reviews should be to help you make a decision on what programs you wish to purchase, in order to get the most for your investment. Second, any truly public domain programs are public property and subject to modification and alteration such that no standard, "official" version really exists for review purposes; we might review one version only for you to acquire a different version, since anyone can change these programs without regard to the original author's wishes.

Our observation is that sources offering public domain programs, such as local BBSs or national information networks, also provide avenues for review of these programs.

HINTS AND TIPS

Editor:

Here is a tip for people who have a CoCo 3 and would like to use BASIC programs that were written for the CoCo 1 or 2. Just insert `WIDTH 32` as a command at the beginning of the program and resave it. They should then work no matter which text screen you run them from.

Does anyone know how to change the default baud rate of the CoCo 3 printer port to 2400? Any help will be greatly appreciated.

Andy Leary
19 Oak Drive
N. Stonington, CT 06359

Try `POKE 150,18`. *For more details, see the Hint on Page 24 of this issue.*

Border Blackout

Editor:

Here's a way to black out the border on *VIP Writer*'s Hi-Res screen. I know it's something everyone has wanted to do and it's possible on the CoCo 3. Save the following programs to your *VIP Writer* disk:

```
10 'DOS.BAS
20 CLS
40 POKE 359,57:POKE 65314,60
70 POKE &HE033,PEEK(&HE033) OR
&H10
90 PRINT"Now RUN program W"
```

```
10 'W.BAS
20 PALETTE 9,0
30 PALETTE 8,63
40 PALETTE 11,63
50 PALETTE 10,0
60 LOADM"WRITER
```

Now type `RUN"DOS`; it will prompt you to type `RUN"W`. Last, type `C` from the command mode and you can feast your eyes on the way

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an inverse screen is supposed to look. Note: don't combine the programs into one program; for some reason it will not work.

Doug Thorsvik
Biloxi, MS

A Grab Bag of Help

Editor:

The program *Lovecard* on Page 36, February 1987 issue, will work on the CoCo 3 by changing lines 100 and 220 to `EXEC 44539`.

A friend has shown me how to boot OS-9 Version 01.01.00 on the CoCo 3. Run the Boot program, then insert an OS-9 disk such as *Rocky's Boot* and press a key. When it loads, remove it, insert your OS-9 disk and press reset. OS-9 comes up ready for use.

VIP Database works on the CoCo 3 under JDOS. You can use JDOS on the CoCo 3 by the following procedure. Switch the system on. The JDOS logo or garbage will come on according to your version. Press the BREAK key twice, the Auxiliary Selection Menu will come up. Press 9. This was meant to load the *Memory Minder* disk drive analysis program into RAM but it loads the ROM into RAM and you are ready to operate in JDOS. JDOS does not recognize the new commands for the CoCo 3.

I hope these hints will help someone. I enjoy the RAINBOW and would like some truly beginner instruction programs on OS-9 such as how to get a program up and running.

Ernest D. Wilkes
Macon, GA

Easy Access

Editor:

As a RAINBOW subscriber since June 1984, I have about 33 issues of this great magazine on file. To save time finding small articles, hints, reviews, questions and answers or one-liners that are not listed in the Table of Contents, I use a self-stick address mailing label which attaches to the front cover where it doesn't cover any printing or graphics. This can be used to list the desired article, a small description and the page number of articles that are of special interest to me. It saves me time and frustration in locating things I know I read in back issues.

Joe Perevosnik
Parma, OH

COCO 3

Editor:

If a CoCo-PC card can be made for IBM compatibles (I'm referring to Compusense's advertisement in the January 1987 issue, Page 95), then it's only fair that they also make a ROM pack card to plug in the MultiPak so that the CoCo can run IBM compatible software.

How about it? The CoCo 3 has the same high resolution and memory capabilities as the IBM so let's have some hardware and software that will let us emulate IBM. Also, whatever happened to the CP/M ROMPak that used to be advertised for the CoCo?

The CoCo's no kid any more. Let's see some FORTRAN, COBOL, Modula-2, Ada and Prolog software. Also, let's have some Apple, Commodore and Atari emulators. Turn about is fair play. They've had their fun at our expense long enough, it's our turn now. Let's show them what the CoCo can really do!

Donald R. Adams
Kokomo, IN

A Vote of Confidence

Editor:

As I sit here at my CoCo 3 using *VIP Writer*, I'm amazed at all the negative comments about Tandy's latest offering. I own a CoCo 1, which was upgraded to 64K, and a 64K CoCo 2; the worst thing I can say about the CoCo 3 is that it will take some getting used to.

I have the old gray drives and multipack, and using the information in the January RAINBOW I changed the PAL chip. Now the disks work perfectly and the whole *VIP Library* seems to run as it's meant to. At least I have yet to find any bugs. As for more keys, I have four just sitting here that Tandy forgot to mention in their manual, and the old CoCos had all the keys I could keep up with. I wouldn't be surprised if Tandy made the extra alphanumeric characters available from the keyboard in the near future. It would be nice if they would drop you a line and explain what to do with the ALT and CTRL keys.

So far I've found that the SHIFT-ALT combination will repeat the last function used in *VIP Writer*.

Richard M. Johnson
Clifton, CO

REQUEST HOTLINE

Editor:

Does anyone know of a program to keep track of a stock portfolio that would work on my 64K CoCo 2 with cassette?

John G. Wood
8 White Birch Court
Schenectady, NY 12306

Check out "See How Your Stocks Stack Up" in the March 1987 issue. Also, our March 1984, '85, '86 and '87 Business/Finance issues all have related programs, including "Stock Index" (March 1985, Page 170).

The CoCo Landlord

Editor:

I would like to know if you have any tapes relating to rental property. I am interested in being able to keep a ledger and journal on rental property plus spreadsheets, etc. I have a 64K CoCo.

Barbara E. Fadis
2678 Floribunda Drive
Columbus, OH 43209

You need "Landlord's Helper," which appeared on Page 106 in our March 1985 issue.

Parlez-vous CoCo?

Editor:

I am looking for some foreign language software, particularly Spanish or French. Can you tell me if there is anything available, and who I should write to for more information.

Dorothy M. Conniff
1614 N. Hermitage Road
Ft. Myers, FL 33907

See Dorsett Educational Systems Introductory Spanish Courses review on Page 146 of this issue.

Looking for a Hitchhiker

Editor:

Is there a version of *Hitchhiker's Guide to the Galaxy* available for a 64K cassette based system? I am looking for a golf game similar to the one that is currently in the arcades with real time action and a version of *Leader Board* that is for the same system. *Leader Board* does exist for the Commodore. Also, any information or help on where to find a screen-dump for an Okidata Microline 92? Responses would be greatly appreciated.

Frank A. Mazotti, III
107 Clearview Drive
N. Syracuse, NY 13212

CoCo Kegler

Editor:

I have a 64K CoCo 2 with a cassette recorder and a printer. I am looking for a company that sells a bowling game. Does anyone know of one?

Andy Rostar
308 Prince Road
Greenville, NC 27858

BOUQUETS

Editor:

I would like to express my appreciation and satisfaction for the outstanding service and speed from Canyon County Devices. I found their advertisement in your December 1986 issue after a long search through several other sources to find colored ribbons for my SG-10 printer. Outstanding service, quality products, who could ask for more?

John S. Taylor
Wausau, WI

A+ for Promptness

Editor:

Cray Augsburg's hardware review [October 1986, Page 148] of the Seikosha SP-1000A printer [furnished to RAINBOW by Cinsoft, Inc.] convinced me. I ordered the 1000A from Metric Industries, Inc., Cincinnati, Ohio on Tuesday. The printer was at my front door on Friday. Subsequently, on a Wednesday, I ordered several extra ribbons for the printer; the ribbons arrived on Monday. Hurrah! for this company. It's nice to know that there are still some people like Metric around who provide good customer service.

Milton W. Kurtz
Baltimore, MD

KUDOS

Editor:

I just want to compliment the author of *AUTOTERM*. The program does much more than advertised, it is much better than I expected.

Curtis E. Barmes
Ladd, IL

Found Pot-of-Gold

Editor:

I bought a new CoCo last year and have since added a CCR-82 cassette recorder and a DMP-130 printer. I discovered RAINBOW last November and have been fortunate enough to locate some back copies. I have enjoyed typing in the programs and particularly the games which my grandchildren and I enjoy playing. I want to compliment you on your program format. It's easy on the eyes. I read Eugene Vasconi's excellent article on the "Bug Zone" in the January 1987 issue [Page 58] and I want to tell you I've been there. I appreciate your recognition that there are beginners out here. I have found a wealth of information in your "Rainbow Tech" and "Letters to Rainbow" departments. From a retiree of 10 years and a senior citizen pushing 70 — keep up the good work!

Chester E. Bidigare
Mt. Clemens, MI

The Doctor Was Right

Editor:

I was glad to see Dr. Marty Goodman's comment on the Multi-Pak interface in September 1986 [Page 178] "CoCo Consultations." I bought *CoCo Max II* in January along with a Y box. I had lots of trouble with it and tended to blame it on *CoCo Max*. On the strength of Marty's comment in RAINBOW, I sent for a Multi-Pak interface from one of your advertisers. It made a tremendous difference, worked perfectly and so did *CoCo Max*. I had never before read anything that so much as suggested that Y cables and Y boxes were not in every way as good and effective as the Multi-Pak interface, although I have only been a regular reader of RAINBOW since November 1984 and could easily have missed a comment in some earlier issue.

Dave Otis
Montpelier, VT

It's a Pleasure

Editor:

It is a pleasure for me to read the Kudos letters. The writers praise the prompt attention given them by your many advertisers. My letter is different. I am praising the responsibility and the prompt attention given to me by the world's greatest Color Computer magazine — RAINBOW.

I receive my copy of next month's issue of THE RAINBOW by the middle of each month. My December issue never arrived. I waited patiently till the first week of December at which time I wrote to Falsoft. Shortly thereafter my doorbell rang. Upon opening the door, there stood a man from United Parcel Service who handed me my precious December issue.

Bob Nevin
Bayside, NY

PEN PALS

- I'm 16 years old and interested in hearing from fellow game nuts. I have a CoCo 1 and 2, disk drive, cassette recorder, Prowriter 8510 printer and lots of games. I am also interested in music programs.

Daniel Bouges
26 Park Place
Niantic, CT 06357

- I am 16 years old and looking for a pen pal. I have a 64K CoCo 1, cassette player, printer, modem, and lots of games and utilities. I am also looking for a screen dump program for the DMP-105.

Chuck Aldrich
P.O. Box 225
Magnolia, DE 19962

- Any Color Computer 1, 2 or 3 users interested in joining a program/pen pal club? For more information, call me at (813) 530-5349 or write me.

Dino Sanchez
2070 62nd Street N.
Apt. 1503
Clearwater, FL 33520

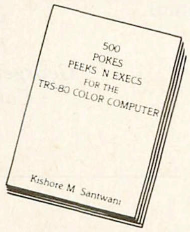
- I have a CoCo 2 with one disk drive, modem, printer and tape. I am 16 years old and love all kinds of Adventure games.

Peter J. Hernandez, Jr.
237 N.E. 110 Terrace
Miami, FL 33161

---

500 POKEs, PEEKs, 'N EXECs

FOR THE TRS-80 COCO



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- I would like to get in touch with other CoCo users around Tampa. Call (813) 920-5571.

Andy Ellinor
Tampa, FL

- I would like to know if there are any CoCo users in Montgomery County who would like to have a pen pal. I have a CoCo 1 with 16K ECB and tapes. I am about to get a CoCo 2 with 64K. I am 14 and go to Sherwood High School.

Michael DiGiovanni
4008 Clover Hill Terrace
Olney, MD 20832

- I own a 64K ECB CoCo with 1 disk drive and a cassette player, and I would like to have a pen pal.

Chip Pulitzer
Box X
Palmer Hill Road
Au Sable Forks, NY 12912

- I live in Kaiserslautern, Germany, and want to meet other CoCo enthusiasts who live around the world. Please write. I have a few interesting OS-9 files that I have written (along with a Dragon translator).

Chris Ahrendt
Psc Box 997
APO, NY 09130

- I have just arrived in Germany and I am looking for other CoCo nuts that are in the service. I am at Herzogenaurack near Nuernberg. I have a 64K CoCo 2, two disk drives, printer, Multi-Pak and cassette.

SFC Edward MacKay
HHB 210th FA Bde
APO, NY 09352

- It's sad to be alone; all of my friends have either Commodores or IBM clones. Any of you CoCo nuts who are interested in sharing public domain software (especially Adventures) or who live in the Fayetteville area, please write me.

Drew Norris
Rt. 3, Box 424-C
Fayetteville, NC 28306

- I'm 13 years old, have a CoCo 3 and I'm looking for pen pals.

David Little
208 W. Garden Street
Landis, NC 28088

- I am 15 years old and have a 64K ECB CoCo, FD-501 disk drive, DMP-105 printer and a CCR-82 tape system and want to correspond with all you CoCo nuts out there.

Chris Curtis
Route 7
Walling, TN 38587

- I would like to have some pen pals. I own a CoCo 3 and I'm interested in hearing from other people with the new computer.

Dave Bell
161½ South 300 East
Smithfield, UT 84335

- I will answer all letters that are sent to me. I am 15½ years old. I have a 64K CoCo 2, cassette recorder, printer and over 200 games on tape. I also love good Adventures. By the way, have you hugged your CoCo today!

Tony Fortino
6805 S. 'G' Street
Tacoma, WA 98408

- I am looking for pen pals that are interested in any Adventures and all forms of heavy metal.

Jim Doyle, Jr.
P.O. Box 9
Barrackville, WV 26559

- I am 27 years old and would enjoy exchanging letters with a computer pen pal. I have a 128K CoCo 3, RGB monitor, disk drive, cassette recorder, printer and modem. Because your outstanding magazine has been so helpful to my understanding of the CoCo, I would like to pass on the favor by helping beginners who might be learning BASIC or assembly language programming.

```
10 PRINT "THANKS"
20 GOTO 10
```

David Mills
2236 Washington Avenue
Huntington, WV 25704

- Do you need help on your Adventure games? Maybe you need one last treasure or a key word to open a locked door. I have solutions to 57 out of 135 Adventure games. I need help too. Let's help each other. Please send an SASE.

B. Mart
715 56th Street
Vienna, WV 26105

- Anybody wanting a CoCo pen pal, please write to me. I have a 64K ECB CoCo 1, disk drive, DMP-105 printer and a cassette recorder.

Marc Andreessen
Rt. 2, Box 103W
New Lisbon, WI 53950

- I'd like to find a pen pal in Alberta who is below the age of 20, has 64K, one drive, DMP-105 printer and knows something about programming with *EDTASM+* (cartridge). The last isn't very important but I'm not too great at machine language programming.

Douglas Cosh
Box 456
Olds, Alberta
Canada T0M 1P0

- I would like to have some pen pals. I have a CoCo 2 and 3, disk drive, modem, printer and cassette. We could talk about the newest games.

Jim Kung
132-43 Avenue N.W.
Calgary, Alberta
Canada T2K 0H6

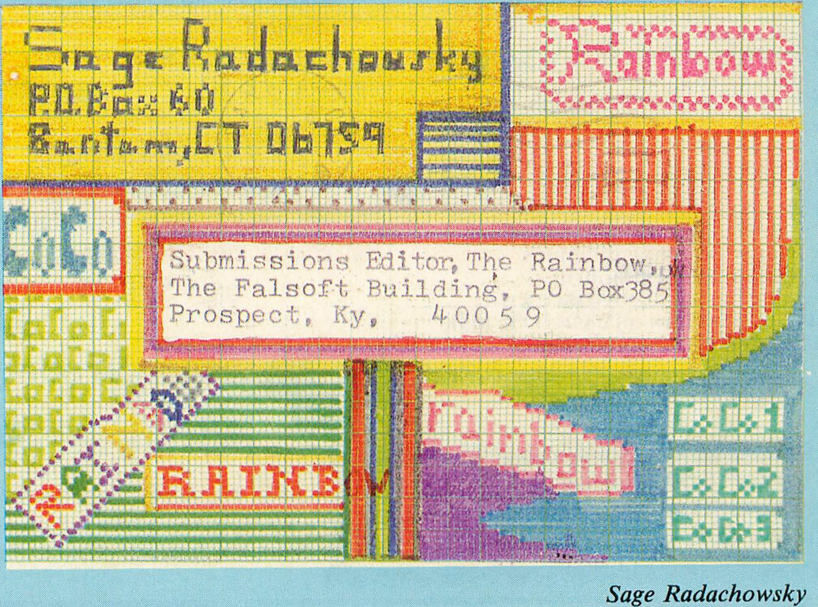
- I am 14 years old and looking for a girl pen pal who lives in the United States or Canada. I have a CoCo 2 and I'm hoping to get a disk drive soon. I'm interested in almost all subjects of life and I have a good sense of humor.

Marc Hodgson
RR 1, 8th Line
Georgetown, Ontario
Canada L7G 4S4

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type `RAI` to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type `LET` to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

ARTS AND LETTERS



Sage Radachowsky
Bantam, CT

Envelope of the Month

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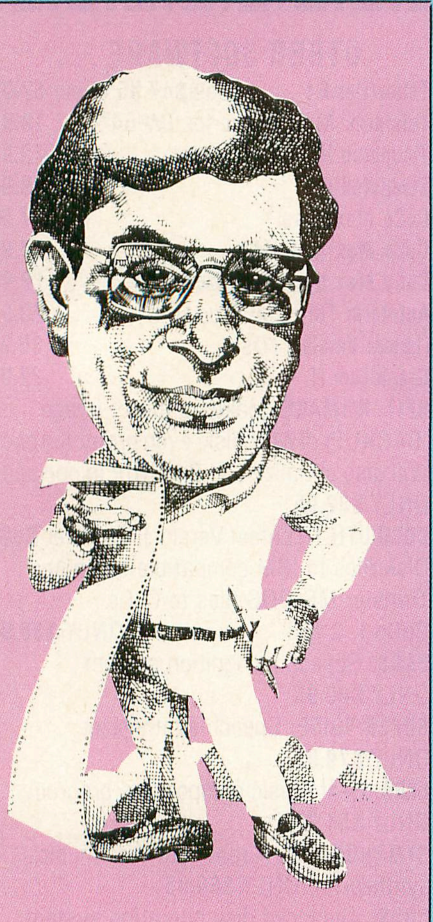

A Few Bad Apples Can Spoil Community Spirit

It has been quite a while since I have written on this particular subject, but a couple of things have happened in the past few weeks, so I suppose it is indeed time to talk about it again.

Recently, I got a letter from a young woman who had previously written to us asking that her name be included in our "Pen Pal" section. She thanked us for doing so because she had met a number of interesting people — but was concerned about some of the letters she had received.

"Several of them," she wrote, "were pretty much nothing more than offers to swap software. One of the people even had a mimeographed list of software he had and was willing to swap for software he didn't have. He sure had a lot of stuff. Most of it was stuff that I see for sale. He even had stuff from THE RAINBOW on the list. I thought you couldn't swap this kind of stuff. Is that right? Or can you?"

Just the other day, Jim Reed walked into my office to report a "little research project." It seems that several people had called BBSs in their towns — one was operated by a CoCo Club — only to find that there was a great deal of commercial software available on two of them.

Jim called the operators of the boards. One said he didn't know he could not give away commercial software. The other flatly told Jim he was "legally right" to do so.

"Why?" asked Jim. "There's a copyright clearly visible on it."

"Well," the person replied, "I know it's OK, because I got them off another BBS, so they are obviously public domain or they wouldn't be on there! I mean, why would it be on a BBS if you can't make copies?"

To both the young lady and the Club BBS SysOp, the answer is the same: NO!

All this puts me in something of a quandary. I say this because through the years one of the consistent themes of THE RAINBOW has been against software piracy. Jim believes piracy is rampant, and I know others who agree with him.

And what is piracy? Piracy is simply giving or selling copies of software you yourself have not written or do not hold the rights to — unless that software is expressly placed in the public domain by the author who did write it.

By the way, public domain and copyright are mutually exclusive. Material is either one or the other; it cannot be both. You *cannot* place something in the public domain and still retain the copyright — contrary to whatever you may have heard.

Piracy is also accepting or buying software unless it is given or sold to you by the person who wrote the program, unless you have legally obtained a license to distribute it, or unless the program has been specifically placed in the public domain.

Any piece of software that has a copyright on it cannot be copied and then given or sold in any way to anyone else. Period. No, not even if you typed it in! All commercial programs are generally copyright — those you see for sale, those in this magazine, and most of those that appear on services such as Delphi and CompuServe. *You* can use the program *yourself*, but the *right to make copies* (the copyright) does *not* transfer to you! The key to whether these programs can be copied is usually whether or not there is a notice of copyright with them. That notice can be made through printing in a magazine, on a disk label, in documentation, within the program itself or in a variety of other ways.

If you sell, buy, give or receive a copyright program, you are in violation of laws — in this country and internationally, as well. Here in the United States, there are very, very stiff penalties for violation of those laws.

So don't violate them. Don't make copies of programs and give or sell them to someone else. Don't buy or accept copies, either.

There is the legal aspect, of course. But, in addition, there is another aspect. And it is just as important as the legal one: If you make copies of programs, you deprive those who hold the copyright of income — income that can be used to pay for the next program. Whether we are talking about someone who has written one program or THE RAINBOW, which publishes 20 or more programs a month, the situation is the same.

If someone writes a good program and doesn't make any money on it, then he or she probably won't write another. It is as simple as that. Who will be deprived the use of that program?

You will, of course.

As I said, there are those who feel piracy is rampant in the CoCo Community. There is a faction who also believes that our listing of Clubs, BBSs and Pen Pals is not much more than a way for pirates to get together. They would like for us to end such listings in THE RAINBOW.

I don't happen to think so, but I am aware this activity exists. It is morally wrong. It is illegal. But it does exist. I just hope we don't have to "do something about it."

We list Clubs, BBSs and Pen Pals to bring the CoCo Community together. I would hate for us to stop. However, if such listings ultimately harm the CoCo Community more than they help, then stop we will.

I would appreciate being notified by you if you know of a Club, a BBS or a Pen Pal illegally trafficking in software. I intend to ban mention of that Club, BBS or Pen Pal from our pages. What I am suggesting is we all clean up our own act and not allow a few bad apples to spoil things for our entire Community.

This is an important issue. I know I can count on the CoCo Community to do the right thing.

— **Lonnie Falk**

Metric Industries

Model 101 Interface $39.95

The Model 101 is a serial to parallel interface intended for use with a COCO and any Centronics compatible parallel input printer. The 101 has 6 switch selectable baud rates (300-9600). The 101 is only 4″ × 2″ × 1″ and comes with all cables and connectors for your computer and printer.

The Model 104 Deluxe Interface $51.95

The Model 104 is a serial to parallel interface like the Model 101 but it has the added feature of a serial port (sometimes referred to as a modem switch). This feature allows the connection of a parallel printer and any serial device (modem, serial printer etc.) to your computer. You may then select either output, serial or parallel, with the flip of a switch. The 104 is only 4.5″ × 2.5″ × 1.25″ and comes with all cables and connectors for your computer. You supply the serial cable for your modem or other serial device.

Model 102 Switcher $35.95

The Model 102 has 3 switch positions that allow you to switch your computer's serial output between 3 different devices (modem, printers or another computer). The 102 has color coded lights that indicate the switch position. These lights also act as power indicators to let you know your computer is on. Supplied with the 102 are color coded labels that can be applied to your accessories. The 102 has a heavy guage anodized aluminum cabinet with non-slip rubber feet.

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Save $8.40 when you purchase the Cassette Label program and label package. You get the Cassette Label program, 100 WHITE labels, 100 RED labels, 100 BLUE labels, 100 YELLOW labels, and 100 TAN labels. A value worth $24.35, but you pay only $15.95. When ordering, specify the Cassette Label PACKAGE

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The Model 101, 102 and 104 will work with any COCO, any level basic and any memory size. These products are covered by a **1 year warranty.**

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RAINBOW Info

How To Read Rainbow

Please note that all the BASIC program listings in THE RAINBOW are formatted for a 32-character screen — so they show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little disk and/or cassette symbols on the table of contents and at the beginning of articles indicate that the program is available through our RAINBOW ON DISK or RAINBOW ON TAPE service. An order form for these services is on the insert card bound in the magazine.

What's A CoCo?

CoCo is an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

However, when we use the term CoCo, we refer to both the Tandy Color Computer and the TDP System-100 Computer. (While many TDP-100s are still in service, the TDP Electronics division of Tandy no longer markets the CoCo look-alike.) It is easier than using both of the "given" names throughout THE RAINBOW.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and Tandy Color are, for all purposes, the same computer in a different case, these terms are almost always interchangeable.

Rainbow Check Plus

The small box accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately.

Rainbow Check PLUS counts the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS,* type in the program and save it for later use, then type in the command RUN and press ENTER. Once the program has run, type NEW and press ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

Using Machine Language

Machine language programs are one of the features of THE RAINBOW. There are a number of ways to "get" these programs into memory so you can operate them.

The easiest way is by using an editor/assembler, a program you can purchase from a number of sources.

An editor/assembler allows you to enter mnemonics into the CoCo and then have the editor/assembler assemble them into specific instructions that are understood by the 6809 chip, which controls your computer.

When using an editor/assembler, all you have to do, essentially, is copy the relevant instructions from THE RAINBOW's listing into CoCo.

Another method of getting an assembly language listing into CoCo is called "hand assembly." As the name implies, you do the assembly by hand. This can *sometimes* cause problems when you have to set up an `ORIGIN` or `EQUATE` statement. In short, you have to know something about assembly to hand-assemble some programs.

Use the following program if you wish to hand-assemble machine language listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I,VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the `&H3F00` in Line 10 to `&H7F00` and change the value of `I` to `&H7F80`.

The Rainbow Seal

RAINBOW
CERTIFICATION
SEAL

The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product that carries the Seal has actually been seen by us, that it does, indeed, exist and that we have a sample copy here at THE RAINBOW.

Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to THE RAINBOW for certification. We ascertain that their products are, in actuality, what they purport to be and, upon such determination, award a Seal.

The Seal, however, is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

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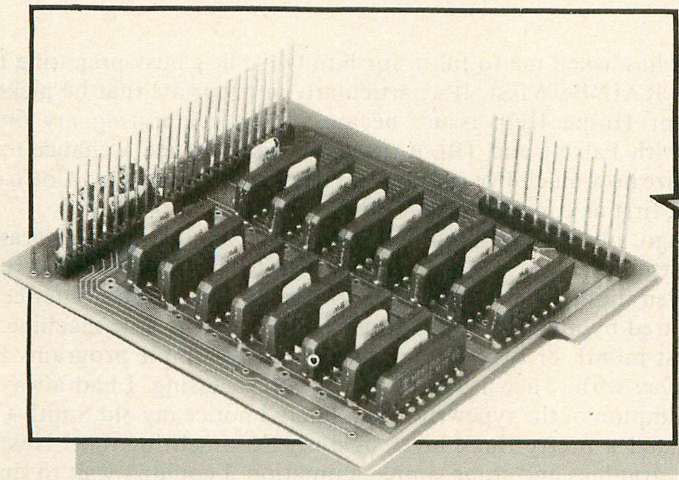

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BUILDING APRIL'S RAINBOW

Heralding the arrival of spring . . . . . . and happy Jo Anna-versary — reflections on a year of Rainbow experience.

Jim Reed has asked me to fill in for him while he's busy preparing for the Chicago RAINBOWfest. It's particularly appropriate that he picked this issue, our Home Help issue, because I am celebrating my one-year anniversary with Falsoft and THE RAINBOW. This gives me a chance to stand back and realize how much I've learned and come to depend on my CoCo during my time here, first as copy editor and now as associate editor.

One year ago, my knowledge of computers was limited to a programming course in college. But I have learned fast; I had to, just to be able to read the magazine! Even though I am in the thick of things here at "computer central," I am still amazed by my discoveries about our wonderful little machine.

For the first month or two, I stuck to games and simple programs I could type in and play with. Then I discovered word processing. I had always been a staunch champion of the typewriter, but lately I notice my old Smith-Corona has accumulated a pretty thick layer of dust. So much for that! Next came spreadsheets, graphics and some simple animation. I couldn't wait to share my discoveries with my family, so I had to have a CoCo at home, too. And it was the 1986 Home Help issue I used to show them how a computer is more than just a game machine. I like to think that with this year's issue, THE RAINBOW is going to help someone else discover the CoCo's charm and versatility.

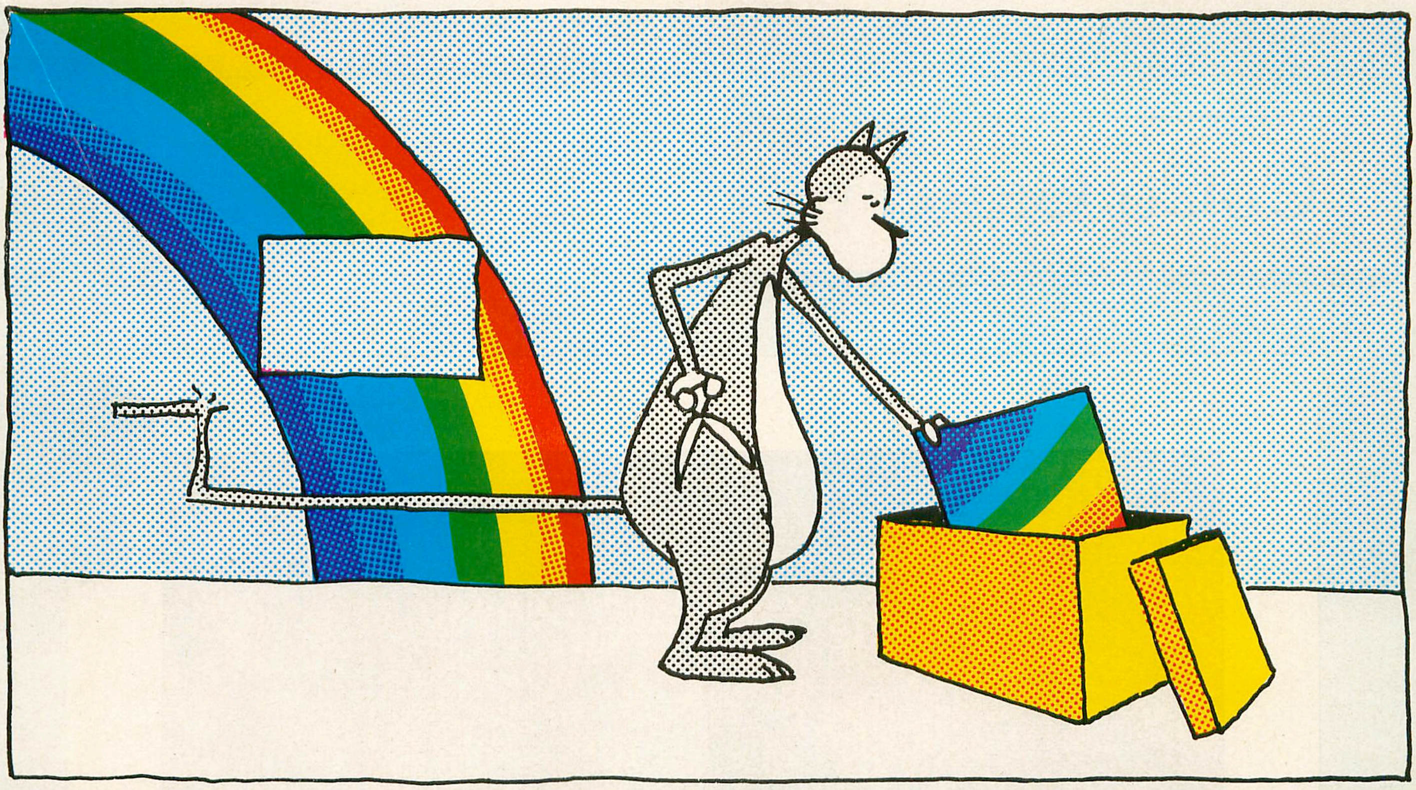
For that purpose, we have included programs to help around the house in many ways. Maintain a freezer food-rotation schedule, control inventory and print price tags for that spring yard sale, and find out how to convert your CoCo into an easy-to-use calculator. For the little ones, be sure to check our offerings from John Collicot, Laura and Chris Petit, Thomas Hood, Fred Scerbo and Steve Blyn. Don't neglect your own education, either. We have tutorials, utilities, question-and-answer columns, and an enlightening article on copyright law. No matter whether you're an old-timer or the new kid on the block, I'm sure you'll enjoy our games and the program shorties in "Novices Niche." I could go on and on, but I'd use the whole magazine telling you what's in it! Suffice it to say, I think there's something here for everyone.

This past year at Falsoft has been a fun one. I've had the opportunity to discover interesting ideas and authors, and to learn not only about computers, but also about a great group of people — the CoCo Community. There is enthusiasm and excitement in the Community. It's full of sharing and a zest for learning that is impressive. We receive hundreds of letters each week from readers of all ages and backgrounds, from the wide-eyed 11-year-old wanting games for his new birthday present, to the electrical engineer with OS-9 questions, to the 83-year-old grandmother with comments about her new hobby. I've witnessed the introduction of the Color Computer 3, and I'm glad to be a part of the team that's making the growing pains a little easier to bear.

If it sometimes seems we're moving ahead too fast, take heart; I'm a beginner, too. I keep my eagle eye on the lookout for programs of interest to beginners — they're my special province. Thank you for making my first year in the CoCo Community so pleasant and educational. I enjoy your articles, programs and letters, and I look forward to hearing about the latest innovations and advancements right along with the rest of the Community.

Don't miss out on the newest techniques and advances for the Color Computer. Ensure your place in the CoCo world with a subscription to THE RAINBOW, the place where great CoCo minds come together. And now we've made it even easier with a new order envelope. It will handle better in the mail than our old postcard, and it will keep your credit card number safe from prying eyes. Here's some real help for you, your home and your CoCo — a RAINBOW subscription. Try it today!

—Jo Anna Arnott



HOW DO YOU GIVE A RAINBOW?

It's simple — Give a RAINBOW gift certificate . . .

Let a gift subscription to THE RAINBOW carry the premier Color Computer magazine right to your friends' doorsteps. THE RAINBOW is *the* information source for the Tandy Color Computer.

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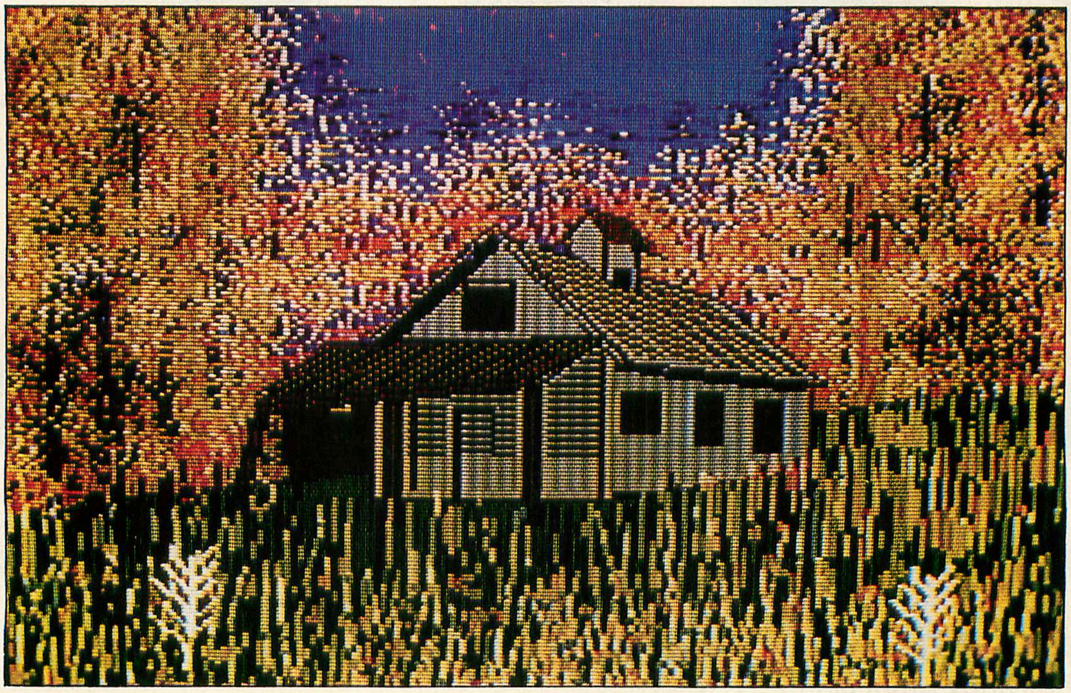
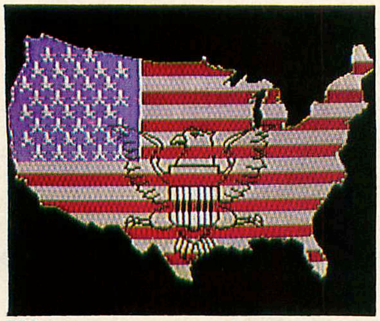
CoCo Gallery



Sugar House *John Murvine, Ebensburg, Pennsylvania*

John illuminates the gallery again this month with the scene of a rustic old sugar house in New England. This graphic was created with BASIC on the CoCo 3.

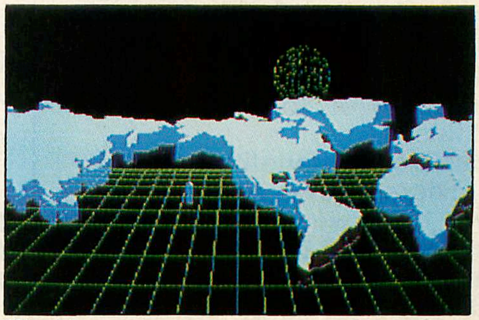
Honorable Mention



USA *Marlo Stueve*
Minnesota City, Minnesota

We pay tribute to the U.S. with Marlo's unique illustration, which was created with BASIC.

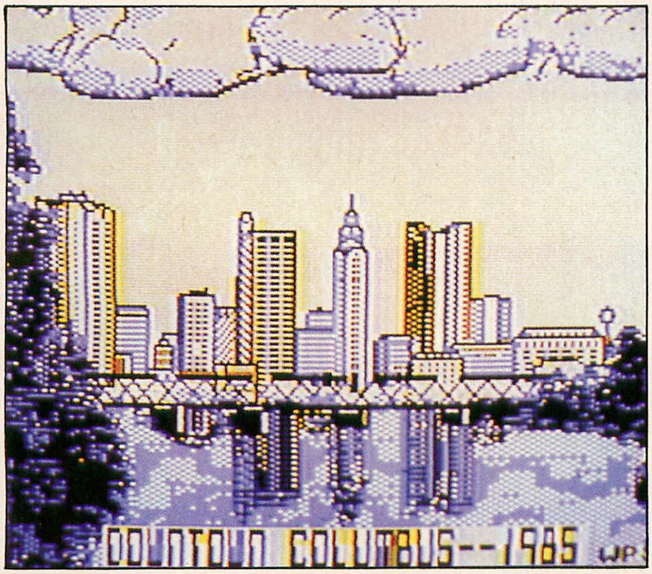
Honorable Mention



World *Chris Foster*
Texarkana, Texas

On a more "global" note, we present this 3-D view of the world. Chris created this using BASIC and the CoCo 3.

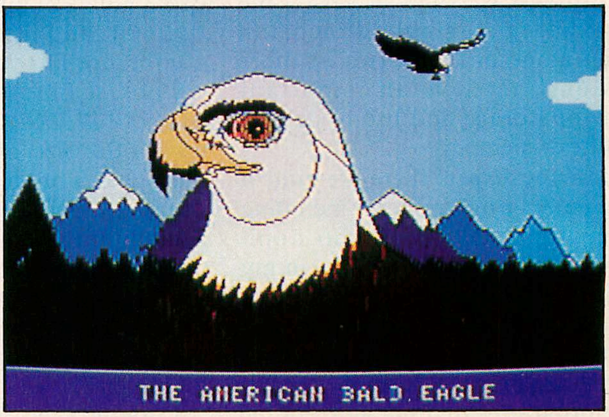
2nd



Downtown Columbus *William Savage*
Columbus, Ohio

Graphicom and *Graphicom II* were used to create this remarkable depiction of downtown Columbus. William is retired from the telephone company and has had his CoCo for about four years.

3rd



Eagle *Wally Mayes*
Hamilton, Ohio

Still a newcomer to the CoCo, Wally used BASIC and the CoCo 3 to create this majestic representation of our national symbol.

SHOWCASE YOUR BEST! You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

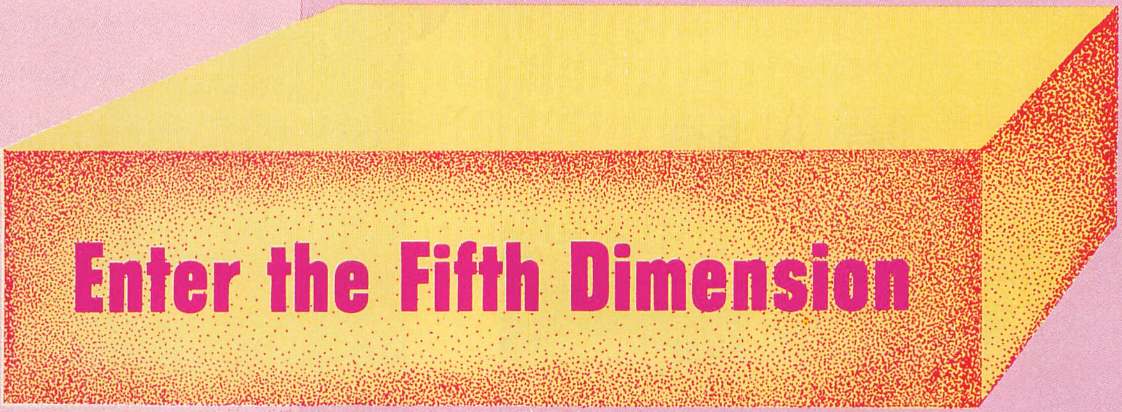
Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will award a first prize of $25, a second prize of $15 and a third prize of $10. Honorable mentions may also be given.

Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember that this is a contest; therefore, your entry will not be returned.

Angela Kapfhammer, Curator

Five-dimensional arrays hold no mysteries when you . . .



Enter the Fifth Dimension

By Robert E. Laun

I am able to visualize two- or three-dimensional objects. However, when it comes to trying to visualize four or five dimensions my brain refuses to cooperate. When I was first learning about my CoCo I had a hard time understanding a single-dimension array, let alone one with two or more dimensions. Yet it is an important concept for storage and use of data in a computer's memory.

I sometimes suspect there are quite a few computer programmers (including a few professional ones) who don't understand arrays. For example, in my daily job I have occasion to use computer-controlled, electronic test equipment. The programs for these computers are written in BASIC. Many of these programs are long and sloppy. Had they used an array for holding and manipulating data, the programs would have more test capacity and would run faster.

I have written a short demonstration program that uses the computer to keep track of a five-dimensional array. The statement `DIM Z(1,1)` would in fact be a two-dimensional array that could hold four different numbers. `Z(0,0)` could hold a number. So could `Z(0,1)`, `Z(1,0)` and `Z(1,1)` each hold a number for later use.

Robert Laun is a retired Air Force Electronics technician. He has been using a Color Computer since 1981. He enjoys writing utility and instructional programs.

Look at Line 10 of the program: `10 DIM Z(2,2,2,2,2)`. For the moment, ignore the size of the array and note only that I used the number 2. The depth of each element in the array is actually three. That is 0, 1 and 2. For purposes of illustration, however, I will not use the 0 element in the program. This makes it a little easier to follow the flow of the program and see what is taking place.

Look at Line 10 again. Note that it has five elements — sort of like length by width by height by ? by ?. You can fill in the question marks with the appropriate words.

Examine lines 20 through 115. These lines allow you to specify a particular element in the array. Since I allow for two possibilities in each element in the array, it gives 32 possible places to store a data element (2 to the 5th power equals 32).

Line 35, `35 IF A<1 OR A>2 THEN 30`, is an error-trapping routine that ensures the user cannot crash the program by specifying a place outside of the array. I could have specified less than 0: `35 IF A<0 OR A>2 THEN 30`. Since the depth of the first element allows for 0, 1 or 2 this would be permissible, but as I said earlier, I am only using 1 and 2 to make the program easier to follow.

Line 117 checks the specified element to see if there is any data there; if it is empty, program flow is routed to Line 120 where you finally get to tell the computer what number you want to store. In Line 125, I limited the size of the number so it would be easier to display later in the program.

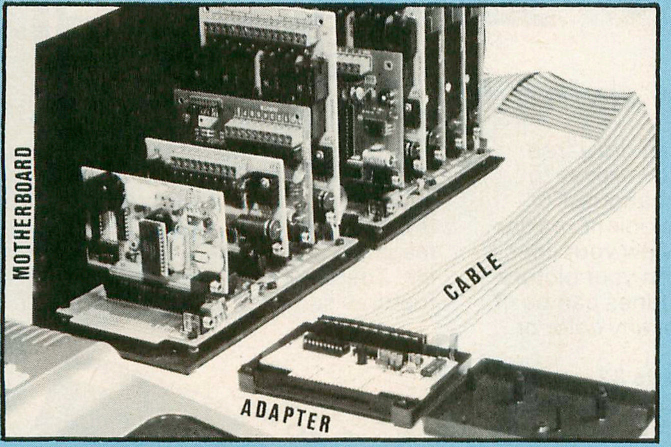
Line 140 puts the data in the proper element within the array. Lines 200 through 300 display each element of the array and what number is stored there. After the display is done, the program jumps back to Line 20 for more data.

I doubt that many people will ever need to use a five-dimensional array, especially since it does use a lot of memory, but the power is there if you need it.

(Questions may be directed to Mr. Laun at 2225 North 67th Circle, Phoenix, AZ 85035. Please enclose an SASE for a reply.) □

The Amazing A-BUS

NEW



An A-BUS system with two Motherboards
A-BUS adapter in foreground

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Alpha's modular A-BUS offers a proven method to build your "custom" system today. Tomorrow, when you are ready to take another step, you will be able to add more functions. This is ideal for first time experimenting and teaching.

A-BUS control can be entirely done in simple BASIC or Pascal, and no knowledge of electronics is required!

An A-BUS system consists of the A-BUS adapter plugged into your computer and a cable to connect the Adapter to 1 or 2 A-BUS cards. The same cable will also fit an A-BUS Motherboard for expansion up to 25 cards in any combination.

The A-BUS is backed by Alpha's continuing support (our 11th year, 50000 customers in over 60 countries).

The complete set of A-BUS User's Manuals is available for $10.

About the A-BUS system:

- All the A-BUS cards are very easy to use with any language that can read or write to a Port or Memory. In BASIC, use INP and OUT (or PEEK and POKE with Apples and Tandy Color Computers)
- They are all compatible with each other. You can mix and match up to 25 cards to fit your application. Card addresses are easily set with jumpers.
- A-BUS cards are shipped with power supplies (except PD-123) and detailed manuals (including schematics and programming examples).

Relay Card RE-140: $129

Includes eight industrial relays, (3 amp contacts, SPST) individually controlled and latched. 8 LED's show status. Easy to use (OUT or POKE in BASIC). Card address is jumper selectable.

Reed Relay Card RE-156: $99

Same features as above, but uses 8 Reed Relays to switch low level signals (20mA max). Use as a channel selector, solid state relay driver, etc.

Analog Input Card AD-142: $129

Eight analog inputs. 0 to +5V range can be expanded to 100V by adding a resistor. 8 bit resolution (20mV). Conversion time 120us. Perfect to measure voltage, temperature, light levels, pressure, etc. Very easy to use.

12 Bit A/D Converter AN-146: $139

This analog to digital converter is accurate to .025%. Input range is −4V to +4V. Resolution: 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple, strain gauge, etc. 1 channel. (Expand to 8 channels using the RE-156 card).

Digital Input Card IN-141: $59

The eight inputs are optically isolated, so it's safe and easy to connect any "on/off" devices, such as switches, thermostats, alarm loops, etc. to your computer. To read the eight inputs, simply use BASIC INP (or PEEK).

24 Line TTL I/O DG-148: $65

Connect 24 input or output signals (switches or any TTL device) to your computer. The card can be set for: input, latched output, strobed output, strobed input, and/or bidirectional strobed I/O. Uses the 8255A chip.

Clock with Alarm CL-144: $89

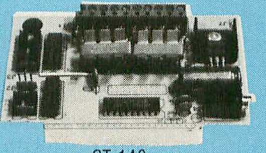
Powerful clock/calendar with: battery backup for Time, Date and Alarm setting (time and date); built in alarm relay, led and buzzer; timing to 1/100 second. Easy to use decimal format. Lithium battery included.

Touch Tone® Decoder PH-145: $79

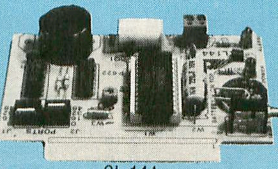
Each tone is converted into a number which is stored on the board. Simply read the number with INP or POKE. Use for remote control projects, etc.

A-BUS Prototyping Card PR-152: $15

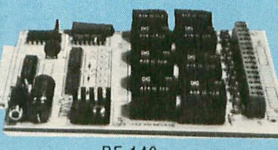
3½ by 4½ in. with power and ground bus. Fits up to 10 I.C.s



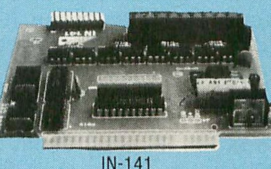
ST-143



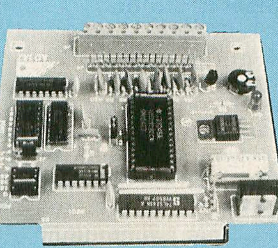
CL-144



RE-140



IN-141



AD-142

Smart Stepper Controller SC-149: $299

World's finest stepper controller. On board microprocessor controls 4 motors simultaneously. Incredibly, it accepts plain English commands like "Move arm 10.2 inches left". Many complex sequences can be defined as "macros" and stored in the on board memory. For each axis, you can control: coordinate (relative or absolute), ramping, speed, step type (half, full, wave), scale factor, units, holding power, etc. Many inputs: 8 limit & "wait until" switches, panic button, etc. On the fly reporting of position, speed, etc. On board drivers (350mA) for small steppers (MO-103). Send for SC-149 flyer.

Remote Control Keypad Option RC-121: $49
To control the 4 motors directly, and "teach" sequences of motions.

Power Driver Board Option PD-123: $89
Boost controller drive to 5 amps per phase. For two motors (eight drivers).

Breakout Board Option BB-122: $19
For easy connection of 2 motors. 3 ft. cable ends with screw terminal board.

Stepper Motor Driver ST-143: $79

Stepper motors are the ultimate in motion control. The special package (below) includes everything you need to get familiar with them. Each card drives two stepper motors (12V, bidirectional, 4 phase, 350mA per phase).
Special Package: 2 motors (MO-103) + ST-143: **PA-181: $99**

Stepper Motors MO-103: $15 or 4 for $39

Pancake type, 2¼" dia, ¼" shaft, 7.5°/step, 4 phase bidirectional, 300 step/sec, 12V, 36 ohm, bipolar, 5 oz-in torque, same as Airpax K82701-P2.

Current Developments

Intelligent Voice Synthesizer, 14 Bit Analog to Digital converter, 4 Channel Digital to Analog converter, Counter Timer, Voice Recognition.

A-BUS Adapters for:

IBM PC, XT, AT and compatibles. Uses one short slot.	AR-133...$69
Tandy 1000, 1000 EX & SX, 1200, 3000. Uses one short slot.	AR-133...$69
Apple II, II+, IIe. Uses any slot.	AR-134...$49
TRS-80 Model 102, 200 Plugs into 40 pin "system bus".	AR-136...$69
Model 100. Uses 40 pin socket. (Socket is duplicated on adapter).	AR-135...$69
TRS-80 Mod 3,4,4 D. Fits 50 pin bus. (With hard disk, use Y-cable).	AR-132...$49
TRS-80 Model 4P. Includes extra cable. (50 pin bus is recessed).	AR-137...$62
TRS-80 Model I. Plugs into 40 pin I/O bus on KB or E/I.	AR-131...$39
Color Computers (Tandy). Fits ROM slot. Multipak, or Y-cable.	AR-138...$49

A-BUS Cable (3 ft, 50 cond.) CA-163: $24

Connects the A-BUS adapter to one A-BUS card or to first Motherboard.
Special cable for two A-BUS cards: CA-162: $34

A-BUS Motherboard MB-120: $99

Each Motherboard holds five A-BUS cards. A sixth connector allows a second Motherboard to be added to the first (with connecting cable CA-161: $12). Up to five Motherboards can be joined this way to a single A-BUS adapter. Sturdy aluminum frame and card guides included.

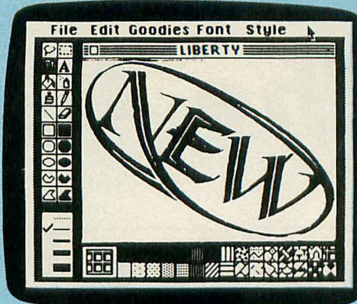
- The A-BUS is not a replacement for the Multi-pak

Add $3.00 per order for shipping.
Visa, MC, checks, M.O. welcome.
NY residents add sales tax.
C.O.D. add $3.00 extra.
Canada: shipping is $5
Overseas add 10%

ALPHA Products
a division of Sigma Industries, Inc.
242 W. Avenue, Darien, CT 06820

Technical info: (203) 656-1806
Orders only Except in NY 800 221-0916
New York orders: (718) 296-5916
All lines open weekdays 9 to 5 Eastern time

CoCo Max™ II



You'll use it all the time and love using it.

What is CoCo Max ?

Simply the most incredible graphic and text creation "system" you have ever seen. A Hi-Res Input Pack (more on the pack later) is combined with high speed machine language software. The result will dazzle you.

CoCo Max
CoCo Max
CoCo Max II

CoCo Max disk system, with Y-cable.

Is CoCo Max for you ?

Anyone who has ever held a pencil or a crayon for fun, school or business will love it. A 4 year-old will have fun doodling, a 15 year-old will do class projects and adults will play with it for hours before starting useful applications (illustrations, cards, artwork, business graphics, flyers, charts, memos, etc.) This is one of the rare packages that will be enjoyed by the whole family.

What made CoCo Max an instant success ?

First there's nothing to learn, no syntax to worry about. Even a child who can't read will enjoy CoCo Max. Its power can be unleashed by simply ***pointing*** and ***clicking*** with your mouse or joystick. With ***icons*** and ***pull down menus,*** you control CoCo Max intuitively; it works the same way you think.

Don't be misled by this apparent simplicity. CoCo Max has more power than you thought possible. Its blinding speed will astound you.

It lets you work on an area 3.5 times the size of the window on the screen. It's so friendly that you will easily recover from mistakes: The ***undo*** feature lets you revert to your image prior to the mistake. As usual, it only takes a single click.

Later, we will tell you about the "typesetting" capabilities of CoCo Max II, but first let's glance at a few of its graphic creation tools:

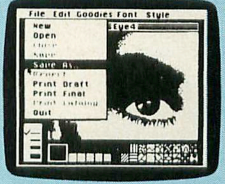
With the ***pencil*** you can draw free hand lines, then use the ***eraser*** to make corrections or changes. For straight lines, the convenient ***rubber-banding*** lets you preview your lines before they are fixed on your picture. It's fun and accurate. Lines can be of any width and made of any color or texture.

The ***paint brush,*** with its 32 selectable brush shapes, will adapt to any job, and make complicated graphics or calligraphy simple.

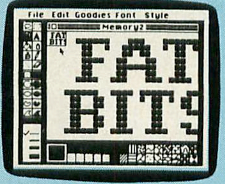
For special effects, the ***spray can*** is really fun: 86 standard colors and textures, all available at a click. It's like the real thing except the paint doesn't drip.

CoCo Max will instantly create many shapes: circles, squares, rectangles (with or without rounded corners), ellipses, etc. Shapes can be filled with any pattern. You can also add hundreds of custom patterns to the 86 which are included.

The ***Glyphics*** are 58 small drawings (symbols, faces, etc.) that can be used as rubber stamps. They're really great for enhancing your work without effort.



Pull down menus



Zoom in !

Control Over Your Work

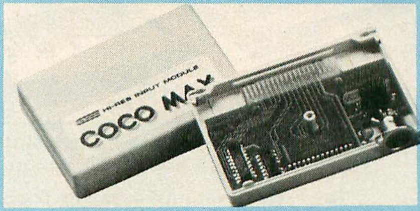
CoCo Max's advanced "tools" let you take any part of the screen, (text or picture) and perform many feats: • You can move it around • Copy it • Shrink or enlarge it in both directions • Save it on the electronic ***Clipbook*** • Flip it vertically or horizontally • Rotate it • Invert it • Clear it, etc. etc.

All this is done instantly, and you can always ***undo*** it if you don't like the results.

For detail work, the ***fat bits*** (zoom) feature is great, giving you easy control over each pixel.

To top it all, CoCo Max II works in color. Imagine the pictures in this ad in color. If you own a Radio Shack CGP-220 or CGP-115, you can even print your work in full color !

There is so much more to say, such as the capability to use CoCo Max images with your BASIC programs, the possibility to use CoCo Max's magic on any standard binary image file. There are also many advanced features such as the incredible ***lasso***.



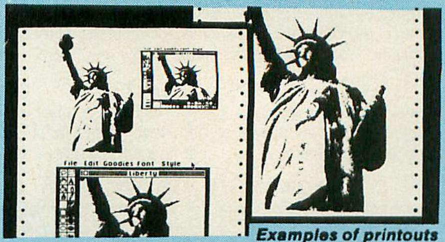
Inside the Hi-Res Input Pack

Why a Hi-Res Input Pack ?

Did you know that the CoCo joystick input port can only access 4096 positions (64x64)? That's less than 10% of the Hi-Res screen, which has 49152 points! (256x192). You lose 90% of the potential. The Hi-Res Input Pack distinguishes each of the 49152 distinct joystick or mouse positions. That's the key to CoCo Max's power. The pack plugs into the rom slot (like a rom cartridge). Inside the pack is a high speed multichannel analog to digital converter. Your existing joystick or mouse simply plugs into the back of the Hi-Res Pack.

Electronic Typesetting...

You'll be impressed with CoCo Max's capability. Text can be added and moved around anywhere on the picture. (You can also rotate, invert and flip it...) At a click, you can choose from 14 built in ***fonts*** each with 16 variations. That's over 200 typestyles !


File Edit Goodies Font Style
Liberty

Examples of printouts

Printing Your Creations

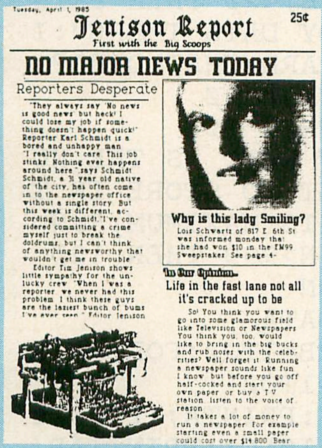
There are a dozen ways to print your work. All are available with a click of your joystick (or mouse) without exiting CoCo Max. Your CoCo Max disk includes drivers for over 30 printers !

All the CoCo Max pictures are **unretouched** screen shots or printouts (Epson RX-80).

CoCo Max II™

The whole family will enjoy CoCo Max. Here are a few examples of the possibilities.

All these pictures are **unretouched** screen photos or printouts (on an Epson RX-80).



Tuesday, April 1, 1985

25¢

Jenison Report

First with the Big Scoops

NO MAJOR NEWS TODAY

Reporters Desperate

"They always say 'No news is good news' but heck! I could lose my job if something doesn't happen quick!" Reporter Karl Schmidt is a bored and unhappy man. "I really don't care. This job stinks. Nothing ever happens around here", says Schmidt. Schmidt, a 31 year old native of the city, has often come in to the newspaper office without a single story. But this week is different, according to Schmidt. "I've considered committing a crime myself just to break the doldrums, but I can't think of anything newsworthy that wouldn't get me in trouble."

Editor Tim Jenison shows little sympathy for the unlucky crew. "When I was a reporter we never had this problem. I think these guys are the laziest bunch of bums I've ever seen." Editor Jenison

Why is this lady Smiling?

Lois Schwartz of 817 E. 6th St. was informed monday that she had won $10 in the FM99 Sweepstakes. See page 4-

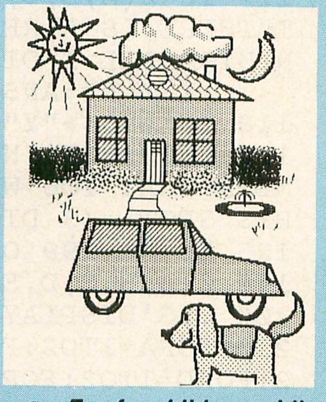
In Our Opinion...

Life in the fast lane not all it's cracked up to be

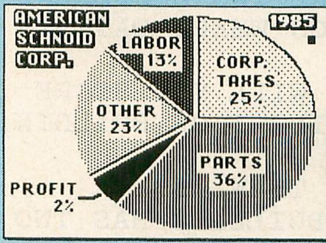
So! You think you want to go into some glamorous field like Television or Newspapers. You think you, too, would like to bring in the big bucks and rub noses with the celebrities? Well forget it. Running a newspaper sounds like fun I know, but before you go off half-cocked and start your own paper or buy a T.V. station, listen to the voice of reason.

It takes a lot of money to run a newspaper. For example starting even a small paper could cost over $14,800. Bear

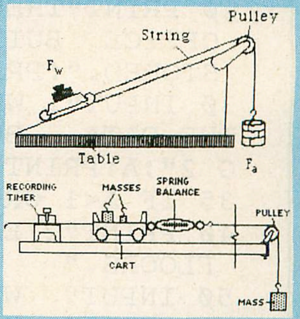
❶ *Publish a newsletter or bulletin*



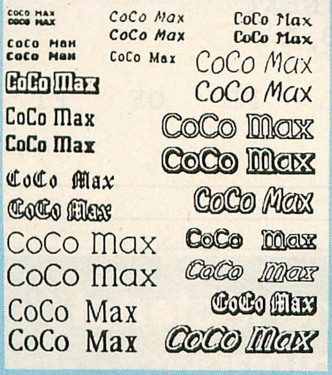
❷ *Fun for children while stimulating creativity.*



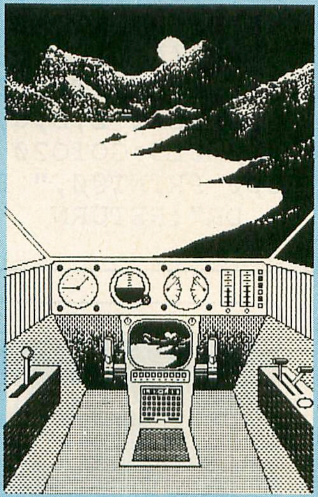
❸ *Business graphs, charts, diagrams. Also memos*



❹ *Junior's homework and science projects. Term papers too !*

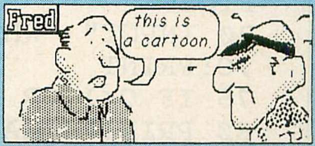


❺ *Over 200 typestyles to choose from! generate flyers.*

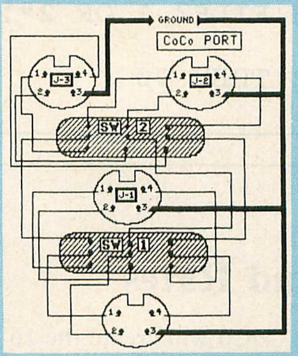


❻ *A new way to express your imagination.*

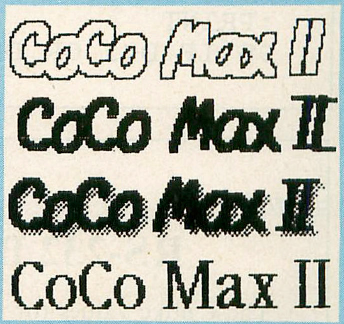
❼ *Video portrait (with optional digitizer).*



❽ *This is a cartoon.*



❾ *schematics and floor plans.*



❿ *Logos and letterheads.*

System Requirements:

Any 64K CoCo and a standard joystick or mouse. (The koala pad and the track ball work, but are not recommended.)

Disk systems need a Multi-Pak or our Y-Cable. CoCo Max is compatible with any Radio Shack DOS and ADOS.

Note: the tape version of CoCo Max includes almost all the features of CoCo Max II except *Shrink, Stretch, Rotate,* and *Glyphics*. Also, it has 5 fonts instead of 14.

CoCo Max is not compatible with JDOS, DoubleDOS, MDOS, OS-9, the X-pad, and Daisy Wheel Printers.

Printers Supported:

Epson MX, RX, FX and LX series, Gemini, Star, Micronix, Delta 10, 10X, 15, 15X, SG-10, Okidata 82A, 92, 93, C. Itoh Pro-writer, Apple Image-writer, Hewlett-Packard Thinkjet, Radio Shack DMP 100, 105, 110, 120, 200, 400, 500, Line Printer 7, Line Printer 8, TRP-100, CGP-220. (DMP-130 use Line Printer 8), PMC printers, Gorilla Banana.

Color printing: CGP-200, CGP-115

Pricing

CoCo Max on tape with Hi-Res Pack and manual.	$69.95
CoCo Max II (disk only) with Hi-Res Pack and manual.	$79.95
Upgrade: CoCo Max to CoCo Max II New disk and manual	$19.95
New features of CoCo Max II: 14 fonts and glyphic font, dynamic shrink and stretch, rotate, multiple drive capability, 68 page scrapbook, point and click file load, color printer drivers, full error reporting.	
Upgrade: CoCo Max tape to disk manuals, disk and binder	$24.95
Y-Cable: *Special Price*	$19.95
Super Picture Disks #1, #2, and #3 each:	$14.95
All three picture disks	$29.95

Guaranteed Satisfaction
Use CoCo Max for a full month.
If you are not delighted with it,
we will refund every penny.

Font Editor Option

A font is a set of characters of a particular style. CoCo Max includes 15 fonts. You can create new fonts of letters, or even symbols or graphics with the font editor. Examples: set of symbols for electronics, foreign alphabets, etc. $19.95

Video Digitizer DS-69

This new Low Cost Digitizer is the next step in sophistication for your CoCo Max system. With the DS-69 you will be able to digitize and bring into CoCo Max a frame from any video source: VCR, tuner, or video camera. Comes complete with detailed manual and C-SEE software on disk. Multi-Pak is required.

New Low Price Save $50 .... $99.95
New: faster DS-69A $149.95

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Woodhaven, NY 11421

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C.O.D. add $3.00 extra.
NY and CT : add sales tax.
Shipping to Canada is $5.00
Overseas, FPO, APO add 10%

The listing: `FIFTHDIM`

```
0 CLS
10 DIM Z(2,2,2,2,2)
20 PRINT"THERE ARE TWO DIFFERENT
 OFFICE  BUILDINGS WHERE DATA IS
 STORED.":PRINT
30 INPUT"1 WHERE WILL YOU STORE
THE DATA   BUILDING 1 OR BUILDIN
G 2";A:PRINT
35 IF A<1 OR A>2 THEN 30
40 PRINT"2 EACH BUILDING HAS TWO
 FLOORS."
50 INPUT"  WHICH FLOOR? 1 OR 2";
B:PRINT
55 IF B<1 OR B>2 THEN50
60 PRINT"3 EACH FLOOR HAS TWO OF
FICES."
70 INPUT"  WHICH OFFICE? 1 OR 2"
;C:PRINT
75 IF C<1 OR C>2 THEN 70
80 PRINT"4 EACH OFFICE HAS TWO F
ILES."
90 INPUT"  WHICH FILE? 1 OR 2";D
:PRINT
95 IF D<1 OR D>2 THEN 90
100 PRINT"5 EACH FILE HAS TWO DR
AWERS."
110 INPUT"  WHICH DRAWER? 1 OR 2
";E:PRINT
115 IF E<1 OR E>2 THEN110
117 IF Z(A,B,C,D,E)<>0 THEN PRIN
T"THERE IS ALREADY DATA THERE":I
NPUT"SHALL I DISCARD THAT DATA?
     Y / N";AN$:ELSE120
118 IF AN$<>"Y" THEN 20
120 INPUT"OK! NOW WHAT IS THE NU
MBER THAT YOU WANT TO STORE IN T
HIS SPOT  (3 DIGITS MAXIMUM)";N
125 IF N<-999 OR N>999 THEN 120
140 Z(A,B,C,D,E)=N
200 CLS'DISPLAY DATA
210 FORA=1TO2:FORB=1TO2:FORC=1TO
2:FORD=1TO2:FORE=1TO2
220 PRINT@480,"";:PRINTA;:PRINTT
AB(5)B;:PRINTTAB(10)C;:PRINTTAB(
15)D;:PRINTTAB(20)E;:PRINTTAB(25
)"="Z(A,B,C,D,E):GOSUB300
225 FORX=1TO100:NEXT
230 NEXT E,D,C,B,A
240 CLS:GOTO20
300 PRINT@0," BL    FL    OF    FI
  DR":RETURN
```

Hint . . .

RS-232 Baud Rates

These poke values for the CoCo will create the 16 most commonly used baud rates. They are as follows:

Baud Rate	Poke 149	Poke 150
50	4	88
75	2	227
110	1	246
134.5	1	153
150	1	110
300		180
600		87
1200		40
1800		25
2000		23
2400		18
3600		10
4800		7
7200		3
9600		1

To achieve 19200 baud, one must use the pokes for 9600 baud and then use the bold poke (65497,0) to double the CoCo's speed. (Use `POKE65496,0` to restore normal speed.)

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submissions Editor, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

The Ultimate Color Computer

Enhancements for Productivity from HJL Products

★ Now at all-time Low prices!

HJL PRODUCTS
Div. of Touchstone Technology Inc.
GoldStar
12" MONOCHROME
Quick Basic Plus
USER'S GUIDE
NUMBERJACK
The HJL Numeric Keypad

Now available for all models, including CoCo 3

To achieve maximum productivity with your Color Computer, you have to make it as easy as possible to get information into and out of the system.

This is why we developed the HJL family of high-performance enhancements for ALL MODELS of the Color Computer.

The Keyboard - ~~$79.95~~ ★ Now $59.95

The overwhelming favorite of serious Color Computer users worldwide, the HJL-57 keyboard has the smooth, consistent feel and reliability you need for maximum speed with minimum input errors. Includes 4 Function Keys and sample function key program. Installs in just a few minutes with no soldering.

The Numeric Keypad - ~~$89.95~~ ★ Now $59.95

The NumberJack is a self-contained, cable-connected keypad for heavy-duty number-crunchers. Besides the number keys, it has all the cursors, symbols and math keys, including autoshifted (one-touch) ADD and MULTIPLY. Comes complete with 3-foot cable and all necessary connectors for quick and easy installation without soldering.

The Monitor Adapter - $25.95

This universal driver works with all monochrome monitors, and is easily installed without clips, jumpers or soldering (except in some later CoCo 2s with soldered-in video chips). Here's crisp, clear, flicker-free monitor output with all the reliability you've come to expect from HJL Products.

The Monitor - $89.95

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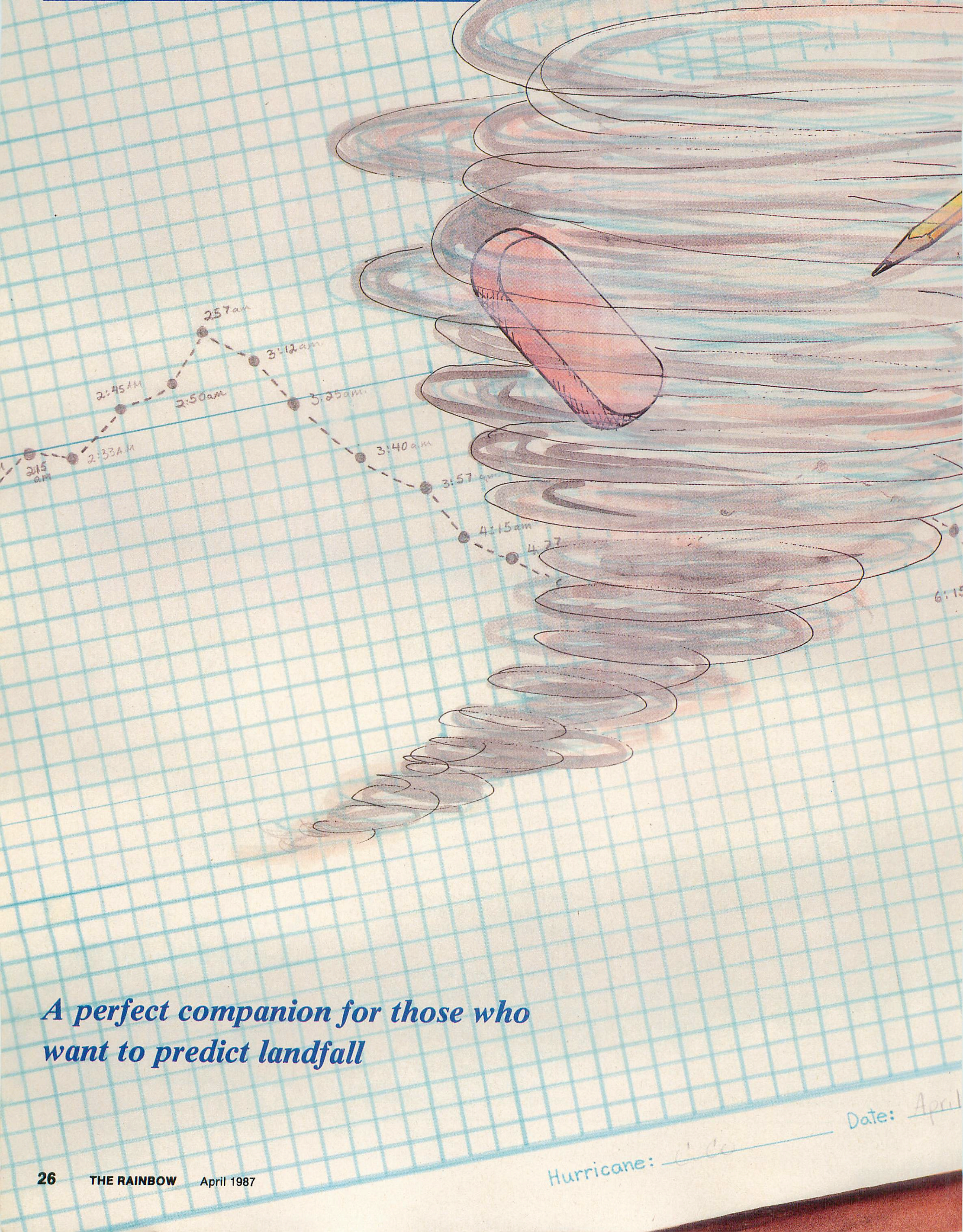
2:15 am
2:33AM
2:45AM
2:50am
2:57am
3:12am
3:25am
3:40am
3:57am
4:15am
4:27
6:15
Hurricane:
Date: April

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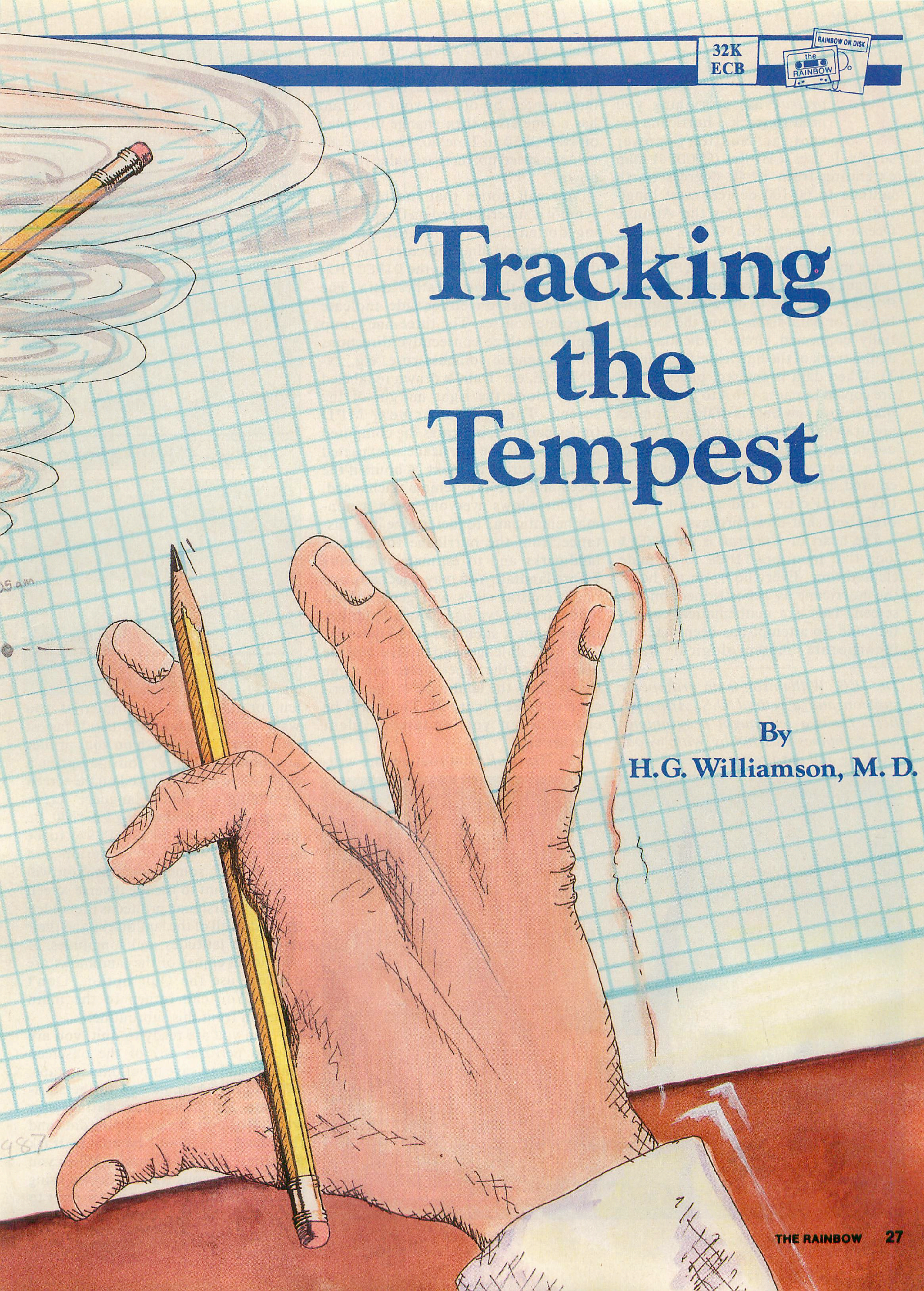
32K
ECB



Tracking the Tempest

By H.G. Williamson, M. D.

Hurrtrak has everything you need to track a hurricane except an auxiliary power supply. It uses a Hi-Res (`PMODE4`) map extending from 10-40 degrees north latitude to 60-100 degrees west longitude. This area includes the Atlantic Ocean, Caribbean Sea, Gulf of Mexico and land masses which are colored red using moire color: `POKE 178,PC`.

Eight graphics pages are cleared and `PMODE4,5` is used to draw the map, the boxes for data display and the sequentially connected circles indicating the actual track of the hurricane (see Figure 1). When data is entered, pages 5 to 8 are copied to pages 1 to 4 to give a clean map before new data is drawn. Prompts are drawn on the lower screen to allow use of subroutines to update weather data, review all data that has been entered, print a copy of the map, identify costal cities and to quit in an organized shut-down process.

The heart of *Hurrtrak* is an `INKEY$` loop that monitors `TIMER` to estimate elapsed time. Every hour, on the hour, the hurricane is repositioned on the screen. This is a mathematical correction and no attempt has been made to incorporate meteorological data.

Dr. H.G. Williamson is an orthopedic surgeon and a retired U.S. Army officer. He is a self-taught programmer and combines this hobby with woodworking and auto restoration.

Whenever `TIMER=>3550`, the minute counter is incremented by one until `MN=>60`, at which time the hour is incremented by one. If your program has a time error then change the value of `TM=>3550` in Line 20. Decrease the value to speed up; increase value to slow down.

You will notice that the hurricane symbol is superimposed on three radiating dotted lines (see Figure 2). The longer central line indicates the predicted course based on the `DIRECTION` input with the last weather data. The shorter lines on either side indicate alternate courses. The three-line group represents three consecutive directions on a magnetic compass rose, e.g., N-NNE-NE, etc. Data is drawn in labeled boxes along the right margin of the screen. The lowermost box, MPD (miles per day), indicates the computed distance that the hurricane is expected to travel during the next 24 hours if the speed and direction remain unchanged.

Ident allows everyone, even a non-mathematician, to determine the distance from the hurricane to selected landmarks and to estimate the hours before landfall. You may select any one of 30 coastal cities and geographical landmarks by typing in a two-letter key taken from a submenu (see Figure 4). The key, mileage and hours will be displayed on the upper screen and a line drawn from the landmark to the hurricane eye (see Figure 3). These will be erased when you update or ident another city.

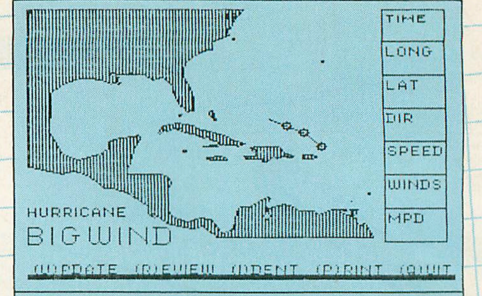
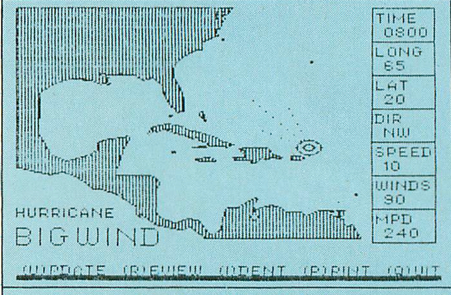
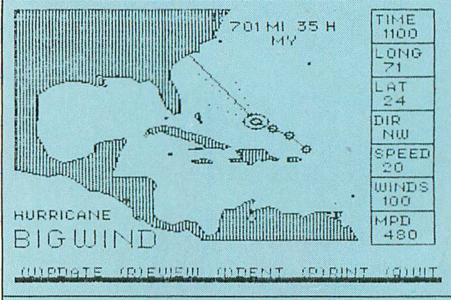


Figure 1: PMODE4,5 Screen



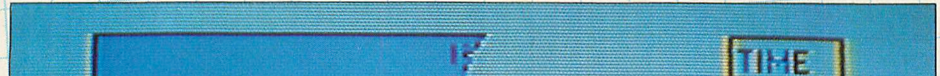
TIME 0800
LONG 65
LAT 20
DIR NW
SPEED 10
WINDS 90
MPD 240
HURRICANE BIGWIND

Figure 2: PMODE4,1 Screen



701 MI 35 H
MY
TIME 1100
LONG 71
LAT 24
DIR NW
SPEED 20
WINDS 100
MPD 480
HURRICANE BIGWIND

Figure 3: Ident Option



TIME 2200
LONG 70
LAT 27
DIR SSE
SPEED 130
WINDS 63
MPD 3120
HURRICANE JIM

The *Hurrtrak* print routines are written for the DMP-105 printer. If you want to print using 2400 baud (fastest rate) then set the switch on your printer and unmask Line 9. You may print a copy of the map displayed on the screen by adding a machine language screen dump program and editing Line 540. Be sure to edit Line 20 (`DEFUSR0`) to be compatible with your program and printer. With some programs, you will probably want to use the inverse screen poke. The first map printed is preceeded by a list of all of the landmarks and their respective latitudes and longitudes. If additional copies of the landmarks are desired, use the Quit option. Don't worry. You can return to the main program from this subroutine.

When you are ready to quit, you are able to perform any of the onscreen options and to save input data on tape. `DIM D$(25,5)` limits you to the start-up data and 25 updates during your track. However, if you save the data and then load it, you will be able to track an infinite number of points. When you load, the previous track is drawn using `PMODE4,5` and the counter `U` is reset to zero. You can now enter 26 new updates. You will not be able to review the previous data unless you made a printed copy while reviewing data before shut down (see Figure 3).

I have not discussed any of the interesting mathematics which one encounters in computer map-drawing of the western longitudes or northern latitudes. The horizontal (X) grid on the video screen is numbered from left to right and the vertical (Y) grid is numbered from top to bottom, the exact opposite of the map needed. Trigonometric functions take a little experimenting because the screen grids have no provisions for negative (X) and (Y) values. Suffice it to say that each space on the 256-by-192 grid represents 13 miles and each five spaces represents one degree of latitude or longitude.

Hurrtrak may be modified for Extended Disk BASIC by changing `#-1` to `#1` and `PRINT` to `WRITE` where they appear in lines 630 and 1000.

(Questions may be directed to the author at 67 Plantation Road, Myrtle Beach, SC 29577. Please enclose an SASE for a reply.) ☐

```
                LANDMARKS

                   LONG  LAT                                 LONG  LAT
(BA)RBADOS         59.5  13.4      (KE)Y WEST                81.8  24.7
(BE)RMUDA          64.6  32.4      (MI)AMI                   80.0  25.8
(BI)LOXI           88.7  30.6      (MO)BILE                  87.8  31.0
(BR)OWNSVILLE      97.2  26.0      (MY)RTLE BEACH            79.0  33.5
(CA)PE HATTERAS    75.3  35.5      (NA)SSAU                  79.2  25.2
(CO)RPUS CHR       97.3  27.9      (NE)W ORLEANS             90.0  30.0
(CU)BA             79.0  22.0      (NI)CARAGUA               85.0  13.0
(DO)M REPUBLIC     70.0  19.0      (NO)RFOLK                 76.0  36.8
(GA)LVESTON        94.7  29.5      (PE)NSACOLA               87.0  30.6
(GC)AYMEN IS       81.2  19.5      (PU)ERTO RICO             66.5  18.5
(GR)ANADA          61.6  12.3      (SA)VANNAH                81.0  32.0
(HA)ITI            72.2  18.7      (TA)MPA                   82.0  28.0
(HO)NDURAS         86.0  15.0      (TR)INIDAD                61.3  10.8
(JA)CKSONVILLE     81.5  30.3      (WI)LMINGTON              78.0  34.1
(JM)AICA           77.0  18.0      (YU)CATAN PEN             88.0  21.0
```

Figure 4: Coastal Cities and Geographical Landmarks

```
HURRICANE BIG WIND     DATE: 11/22/86
TIME        LONG        LAT         DIR         VEL         WINDS
0800        65          20          NW          10          90
0900        67          22          NNW         15          93
1000        69          23          WNW         18          98
1100        71          24          NW          20          100
** END **
```

Figure 5: Review Option

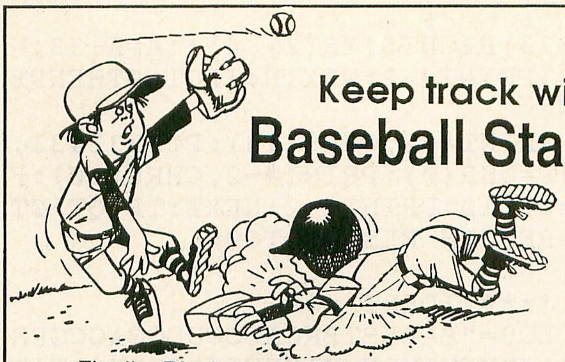
40	238	625	84
120	136	720	72
215	253	850	22
260	50	920	170
365	247	970	232
450	146	1065	157
520	128	1130	44
565	75	END	112

The listing: HURRTRAK

```
0 '******************************
1 '      < HURRTRAK >
2 '
3 '          BY
4 '    H. G. WILLIAMSON
5 '    67 PLANTATION ROAD
6 '  MYRTLE BEACH, SC 29577
7 '     COPYRIGHT OCT 1986
8 '******************************
9 'POKE149,0:POKE150,18:'2400BAU
D
10 GOTO 640
15 CLS6:DIM D$(25,5),D1(25),D2(2
5):R=57.29577951
20 TM=3550:MH=60:U=-1:DEFUSR0=31
913:'PRINT MAP
25 PRINT@160," ENTER NAME OF HUR
RICANE":PRINT" ";:LINEINPUTHN$:P
RINT:PRINT" ENTER DATE  [MM/DD/Y
R]":PRINT@302,"";:LINEINPUTDA$
30 SOUND150,1:CLS:PRINTTAB(5)"**
 INSTRUCTIONS **":PRINT:PRINT"
1. LINES 20,530,540 MUST BE":PRI
NT"     EDITED FOR YOUR PRINTER"
:PRINT"     AND SCREEN DUMP PROG
RAM.":PRINT"  2. WHEN MAP IS DIS
PLAYED"
35 PRINT"     TYPE THE LETTER IN
 THE":PRINT"     PARENTHESES TO:
":PRINT"        (U)PDATE DATA":PR
INT"        (P)RINT MAP":PRINT"
     (R)EVIEW DATA ENTERED":PRIN
T"        (I)DENTIFY LANDMARK":PR
INT"        (Q)UIT":PRINT:PRINT"
  **** PRESS ANY KEY ****"
40 GOSUB655:GOSUB210
45 TIMER=0
50 A$=INKEY$
55 CIRCLE(X,Y),4,0,.8:CIRCLE(X,Y
),8,0,.8:IF A$<>""THEN425
60 FORT=1TO20:NEXT
65 CIRCLE(X,Y),4,1,.8:CIRCLE(X,Y
),8,1,.8
70 IFTIMER>TM THENMI=MI+1:IFMI<M
H THEN45ELSEMI=0:GOSUB155:GOSUB1
15:GOTO45
75 FORT=1TO200:NEXT:GOTO50
80 '
85 '** ADJUST MIN  **
90 MI=MI+INT(TIMER/3550+.5):PMOD
```

```
E4,1:SCREEN1,1:GOTO45
95 '
100 '****** SUBROUTINES *******
105 '
110 '*** UPDATE HOUR ***
115 H=VAL(HR$)+1:MI$="00":IFH=25
THENH=1
120 H$=STR$(H):IFH<10 THEN HR$="
0"+RIGHT$(H$,1)ELSE HR$=RIGHT$(H
$,2)
125 U$(1)=HR$+MI$
130 X$=STR$(INT(10*(100-(X/5)))/
10):U$(2)=RIGHT$(X$,LEN(X$)-1)
135 X$=STR$(INT(10*(40-(Y/5)))/1
0):U$(3)=RIGHT$(X$,LEN(X$)-1):X$
=""
140 B=20:X$="":UD=1:FORN=1TO3:D$
=U$(N):GOSUB310:NEXTN:UD=0
145 '
150 '*** MOVE EYE/HR ***
155 SOUND150,1:SOUND150,1
160 IF X<1 OR Y<1 THEN 175 ELSE
X=X+COS(AN/R)*(S/13):Y=Y+SIN(AN/
R)*(S/13)
165 IFX>200ORX<1ORY>150ORY<1THEN
180
170 RETURN
175 IFX<1THENX=1ELSEIFY<1THENY=1
180 CIRCLE(X,Y),4,0:CIRCLE(X,Y),
8,0
185 '
190 '*** END TRAP ***
195 SOUND150,1:FORT=1TO100:NEXT:
GOTO195
200 '
205 '**  INPUT DATA  **
210 CLS:U=U+1:PRINT@32,"HURRICAN
E NAME: ";HN$:PRINT"DATE
  : ";DA$:SOUND150,1:LINEINPUT"
TIME  <2400> : ";D$(U,0):HR$=LEF
T$(D$(U,0),2):MI=VAL(RIGHT$(D$(U
,0),2)):TI=MI:L=4
215 L=L+1:SOUND150,1:LINEINPUT"
W LONGITUDE   : ";D$(U,1):X=VAL(D
$(U,1)):IFX>99ORX<55THEN215ELSEX
=5*(100-X):D1(U)=X:XD=X
220 L=L+1:SOUND150,1:LINEINPUT"
N LATITUDE    : ";D$(U,2):Y=VAL(D
$(U,2)):IFY>39ORY<10THEN220ELSEY
=5*(40-Y):D2(U)=Y:YD=Y
225 GX=0:FORN=0TO15:PRINT@(GX*32
)+27,C$(N);:GX=GX+1:NEXT:PRINT@2
56,"";
230 PRINT@32*L,"";:SOUND150,1:LI
NEINPUT" DIRECTION      : ";D$(U,3
):FORN=27TO507STEP32:PRINT@N,"
 ";:NEXT:PRINT@32*(L+1),"";
235 FORN=0TO15:IFC$(N)=D$(U,3)TH
ENAN=270-(N*22.5):GOTO245
240 NEXTN:D$(U,3)="UNK":AN=225
245 SOUND150,1:LINEINPUT" SPEED
   MPH : ";D$(U,4):S=VAL(D$(U,4)
):IFS=0THENS=1
250 SOUND150,1:LINEINPUT" WINDS
   MPH : ";D$(U,5)
255 SOUND150,1:PRINT"     <E>RROR
 ?"
260 X$=INKEY$:IFX$=""THEN260ELSE
IFX$="E"THENCLS:GOTO210
265 CLS1:X$=STR$(S*24):MD$=RIGHT
$(X$,LEN(X$)-1):X$=""
270 '
275 '*** TRACK FROM START ***
280 PMODE4,5:SCREEN1,1:IF U>0 TH
EN COLOR0:FORN=0TOU-1:LINE(D1(N)
,D2(N))-(D1(N+1),D2(N+1)),PSET:C
IRCLE(D1(N),D2(N)),3,0:NEXTN:CIR
CLE(D1(N+1),D2(N+1)),3,0
285 PMODE4,1:PCLS1:SCREEN1,1:FOR
N=1 TO 4: PCOPY N+4 TO N:NEXT
290 '
295 '*** DRAW DATA ***
300 PMODE4,1:SCREEN1,1:B=20:X$="
"
305 FORN=0TO5:D$=D$(U,N)
310 L=LEN(D$)
315 IFVAL(D$)>0THEN345
320 FORZ=1TOL
325 Z$=MID$(D$,Z,1)
330 FORQ=1TO26:IFMID$(W$,Q,1)=Z$
THENX$=X$+L$(Q):GOTO340
335 NEXTQ
340 NEXTZ:GOTO355
345 FORZ=1TOL:Z$=MID$(D$,Z,1):IF
Z$="."THENW=10ELSE W=VAL(Z$)
350 X$=X$+N$(W):NEXTZ
355 COLOR1:LINE(214,B-7)-(248,B+
1),PSET,BF:COLOR0:DRAW"S4C0BM220
,"+STR$(B)+X$:X$="":B=B+24:X$=""
360 IF UD=1 THEN RETURN
365 NEXTN:DRAW"C0BM220,164":FOR
N=1 TO LEN(MD$):DRAW N$(VAL(MID$
(MD$,N,1))):NEXT N
370 '
375 '*** PREDICT COURSE ***
380 D=6:DD=D
385 FORCR=AN+22.5TOAN-22.5STEP-2
2.5:IFAN=CR THENKJ=8ELSEKJ=5
390 FORN=1TOKJ:PSET(XD,YD,CL):A=
INT(COS(CR/R)*DD)+XD:B=INT(SIN(C
R/R)*DD)+YD
395 IFA<0ORB<0THEN155
400 PSET(A,B,CL):DD=DD+D
405 NEXT N:DD=D:NEXTCR:IFCL=0THE
N RETURN ELSE CL=0:GOTO380
410 '
```

```
415 '
420 '*** SCREEN OPTIONS ***
425 IFA$="R"THEN475
430 IFA$="P" AND PM=1 THEN 540 E
LSE IF A$="P" THEN PM=1:GOTO530
435 IFA$="I"GOSUB555:GOSUB380:GO
TO90
440 IFA$="U"THEN GOSUB210:GOTO90
445 IFA$<>"Q"THEN65
450 CLS:T=0:PRINT@71,"READY TO S
HUT DOWN":PRINT@99,"SELECT ONE O
R MORE NUMBERS":PRINT:PRINT"    0
. RETURN":PRINT"    1. PRINT WEAT
H/BULL DATA":PRINT"    2. PRINT L
ANDMARKS":PRINT"    3. PRINT MAP"
:PRINT"    4. RECORD ON TAPE":PRI
NT"    5. SHUT DOWN"
455 A$=INKEY$:IFA$=""THEN455ELSE
QT=VAL(A$):IF A$="0"THEN 90 ELSE
 IF QT>5 THEN 455
460 ON QT GOSUB 505,530,540,625,
195:GOTO 450
465 '
470 '*** REVIEW ***
475 CLS:PRINT"HURRICANE "+HN$:PR
INT"DATE: ";DA$:PRINT"TIME  LONG
 LAT   DIR  VEL  WIND"
480 FOR N=0 TO U
485 PRINTD$(N,0)TAB(6)D$(N,2);TA
B(11)D$(N,2);TAB(17)D$(N,3);TAB(
22)D$(N,4);TAB(27)D$(N,5)
490 NEXT:PRINT:PRINT"PRINT COPY?
 <Y/N>"
495 A$=INKEY$:IFA$=""THEN495ELSE
CLS:IFA$<>"Y"THEN90
500 '
505 PRINT#-2,TAB(10)"HURRICANE "
+HN$+"     DATE: "+DA$
510 PRINT#-2,TAB(10)"TIME";TAB(2
0)"LONG";TAB(30)"LAT";TAB(40)"DI
R";TAB(50)"VEL";TAB(60)"WINDS"
515 FORN=0TOU:FORM=0TO5:PRINT#-2
,TAB(M*10+10)D$(N,M);:NEXTM:PRIN
T#-2:NEXTN:PRINT#-2,TAB(10)"** E
ND **":PRINT#-2:IF QT>0 THEN RET
URN ELSE GOTO90
520 '
525 '*** PRINT MAP ***
530 PRINT#-2,CHR$(27)CHR$(14)TAB
(15)"LANDMARKS";CHR$(27)CHR$(15)
:PRINT#-2:FORT=27TO60STEP33:PRIN
T#-2,TAB(T)"LONG  LAT";:NEXT:PRI
NT#-2:FORN=1TO113STEP8:C=(N+7)/8
:X$(1)=I$(C):X$(2)=I$(C+15):Y$(1
)=MID$(LC$,N,8):Y$(2)=MID$(LC$,N
+120,8)
535 A=10:FORZ=1TO2:PRINT#-2,TAB(
A)X$(Z)TAB(A+17)LEFT$(Y$(Z),4)TA
```



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```
B(A+23)RIGHT$(Y$(Z),4);:A=A+33:N
EXTZ:PRINT#-2:NEXTN:IFQT>0THENRE
TURN
540 PRINT#-2,CHR$(18):POKE32431,
255:P=USR(0):PRINT#-2,CHR$(30):F
ORN=1TO10:PRINT#-2:NEXT:IF QT>0T
HEN RETURN ELSE GOTO90
545 '
550 '*** IDENT ***
555 LO$="BABEBIBRCACOCUDOGAGCGRH
AHOJAJMKEMIMOMYNANENINOPEPUSATAT
RWIYU"
560 CLS1:K$="":FORN=1TO29STEP2:P
RINTI$(N),I$(N+1):NEXT
565 IFJ>0THENCOLOR1:LINE(IX,IY)-
(I,J),PSET
570 A$=INKEY$:IFA$=""THEN570ELSE
IFASC(A$)=13THEN90
575 K$=K$+A$:IFLEN(K$)<2THEN570
580 CLS1:FORN=1TO59STEP2:Z$=MID$
(LO$,N,2):Q=(N+1)/2:IFZ$=K$THENG
OTO 590
585 NEXT:IFK$=""THEN90ELSE560
590 P$=MID$(LC$,(8*Q)-7,8):I=VAL
(LEFT$(P$,4)):J=VAL(RIGHT$(P$,4)
):P$=""
595 I=5*(100-I):J=5*(40-J)
600 SCREEN1,1:COLOR0:LINE(I,J)-(
X,Y),PSET:IX=X:IY=Y:DX=ABS(I-X):
DY=ABS(J-Y):H=SQR(DX^2+DY^2):V=1
1.3*H:C$=STR$(INT(V)):L=LEN(C$):
C$=RIGHT$(C$,L-1):L=L-1:LX$=C$:G
OSUB380
605 COLOR1:LINE(130,8)-(210,26),
PSET,BF:DRAW"C0BM130,15":FORZ=1T
OL:DRAWN$(VAL(MID$(C$,Z,1))):NEX
T:DRAW"BR3"+L$(13)+L$(9)+"BR6"
610 LC=INT(VAL(LX$)/S+.5):LX$=ST
R$(LC):L=LEN(LX$)-1:LX$=RIGHT$(L
X$,L):Y$="":FORZ=1TOL:DRAW N$(VA
L(MID$(LX$,Z,1))):NEXT:DRAW"BR3"
+L$(8):N=ASC(LEFT$(K$,1))-64:W=A
SC(RIGHT$(K$,1))-64:DRAW"C0BM155
,25"+L$(N)+L$(W):RETURN
615 '
620 '**  RECORD ON TAPE  **
625 CLS:PRINT@160," READY TO SAV
E ON TAPE ":PRINT" PRESS ANY KEY
 WHEN READY":EXEC44539
630 OPEN"O",#1,"HURRDATA":WRITE#
1,U:FORN=0TOU:WRITE#1,D1(N),D2(N
):FORW=0TO5:WRITE#1,D$(N,W):NEXT
W,N:CLOSE#1:RETURN
635 '
640 CLEAR650:PCLEAR8:GOTO 15
645 '
650 '*** LETTERS ***
655 DIML$(28):FORN=1TO28:READL$(
N):NEXT
660 DATA U4E2F2D2L4R4D2BR3
665 DATA U6R3F1D1G1L3R3F1D1G1L3B
R7
670 DATA BR4 BU1G1L2H1U4E1R2F1BD
5BR3
675 DATA U6L1R4F1D4G1L4BR8
680 DATA BR4L4U3R3L3U3R4BD6BR3
685 DATA U3R3L3U3R4BD6BR3
690 DATA BE4BU1H1L2G1D4F1R2E1U2L
1R2BD3BR3
695 DATA U6D3R4U3D6BR3
700 DATA U6BR3BD6
705 DATA BU1F1R2E1U5BR3BD6
710 DATA U6D4E4G3F3BR3
715 DATA U6D6R4BR3
720 DATA U6D1F3E3U1D6BR3
725 DATA U6F5U5D6BR3
730 DATA BR1H1U4E1R2F1D4G1L2BR6
735 DATA U6R3F1D2G1L3BR7BD2
740 DATA BR1H1U4E1R2F1D4G1H1F2H1
L2BR6BD1
745 DATA U6R3F1D2G1L3R2F2BR3
750 DATA BU1F1R2E1U1H1L2H1U1E1R2
F1BD5BR3
755 DATA BR2U6L2R4BD6BR3
760 DATA BU6D5F1R2E1U5BR3BD6
765 DATA BU6D4F2E2U4BR3BD6
770 DATA BU6D5F1R1E1U5D5F1R1E1U5
BR3BD6
775 DATA U1E4U1BL4D1F4D1BR3
780 DATA BU6D2F2D2U2E2U2BR3BD6
785 DATA BU6R4D1G4D1R4BR3
790 DATA BR1H1U4E1BD6BR3
795 DATA E1U4H1BR5BD6
800 '***** NUMBERS
805 DIMN$(10):FORN=0TO10:READN$(
N):NEXT
810 DATA BR1H1U4E1R2F1D4G1L2BR6
815 DATA BU5E1D6BR3
820 DATA BU4U1E1R2F1D1G4R4BR3
825 DATA BU6R4G2L1R2F1D2G1L2H1BD
1BR7
830 DATA BR4U6G4R5BD2BR3
835 DATA BU1F1R2E1U2H1L3U2R4BD6B
R3
840 DATA BE4BU1H1L2G1D4F1R2E1U1H
1L2G1BD2BR7
845 DATA BR1U1E4U1L5BD6BR8
850 DATA BE3E1U1H1L2G1D1F1R2F1D1
G1L2H1U1E1BD3BR6
855 DATA BU1F1R2E1U4H1L2G1D1F1R2
E1BD4BR3
860 DATA U1R1D1BR3
865 '
870 '***** TITLES
875 DIMT$(12):FORN=1TO12:READT$(
N):NEXT
```

```
880 DATA 20091305,12151407,12012
0,040918,1916050504,2309140419,1
31604,27212816040120 05,271828052
2090523,2709280405142 0,271628180
91420,2717282109 20
885 '
890 '***** DIRECTIONS
895 DIMC$(15):FORN=0TO15:READC$(
N):NEXT
900 DATA N,NNW,NW,WNW,W,WSW,SW,S
SW,S,SSE,SE,ESE,E,ENE,NE,NNE
905 '
910 '***** LOCATE ID
915 DIM I$(30):FORN=1TO30:READI$
(N):NEXT
920 DATA (BA)RBADOS,(BE)RMUDA,(B
I)LOXI,(BR)OWNSVILLE,(CA)PE HATT
ERAS,(CO)RPUS CHR,(CU)BA,(DO)M R
EPUBLIC,(GA)LVESTON,(GC)AYMEN IS
,(GR)ANADA,(HA)ITI,(HO)NDURAS,(J
A)CKSONVILLE,(JM)AICA
925 DATA (KE)Y WEST,(MI)AMI,(MO)
BILE,(MY)RTLE BEACH,(NA)SSAU,(NE
)W ORLEANS,(NI)CARAGUA,(NO)RFOLK
,(PE)NSACOLA,(PU)ERTO RICO,(SA)V
ANNAH,(TA)MPA,(TR)INIDAD,(WI)LMI
NGTON,(YU)CATAN PEN
930 LC$="59.513.464.632.488.730.
697.226.075.335.597.327.979.022.
070.019.094.729.581.219.561.612.
372.218.786.015.081.530.377.018.
081.824.780.025.887.831.079.033.
579.225.290.030.085.013.076.036.
887.030.666.518.581.032.082.028.
061.310.878.034.188.021.0
935 '***** W$ STRING
940 FORN=1TO28:READA$:W$=W$+A$:N
EXTN
945 DATAA,B,C,D,E,F,G,H,I,J,K,L,
M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z,[,]
950 '
955 '**  TEST SQUARES  **
960 EXEC44539:PMODE4,1:PCLS1:SCR
EEN1,1:Z$="23080903 08XX031512151
8":DRAW"C0BM95,80":FORN=1TO21STE
P2:X$=MID$(Z$,N,2):X=VAL(X$):IFX
=0THENL$(X)="BR8"
965 DRAWL$(X):NEXT:Z$="":COLOR0:
LINE(115,90)-(125,100),PSET,B:PO
KE178,1:PAINT(120,95),,0:COLOR0:
LINE(136,90)-(146,100),PSET,B:PO
KE178,2:PAINT(140,95),,0:DRAW"C0
BM119,115"+N$(1):DRAW"C0BM+16,0"
+N$(2):SOUND150,1
970 A$=INKEY$:IFA$=""THEN970ELSE
 PC=VAL(A$):IF PC<1 OR PC>2 THEN
```

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```
10 INPUT A$
20 PRINT #-2,A$
30 GOTO 10
```

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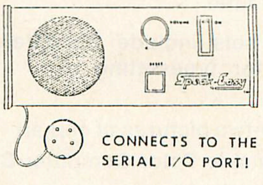

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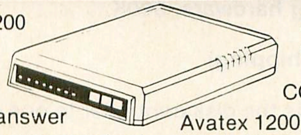

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```
 970
975 '
980 '*** INPUT RECORDED DATA ***
985 CLS:PRINT@194,"INPUT SAVED D
ATA?  <Y/N>"
990 A$=INKEY$:IFA$=""THEN990ELSE
 IF A$="N"THEN 1015
1000 OPEN"I",#1,"HURRDATA":INPUT
#1,U:FORN=0TOU:INPUT#1,D1(N),D2(
N):FOR W=0 TO 5: INPUT#1,D$(N,W)
:NEXTW,N:CLOSE#1
1010 '**  DRAW MAP  **
1015 PMODE4,5:PCLS1:SCREEN1,1:CO
LOR0:IF RS=1 GOSUB280:RS=0:U=-1
1020 READA,B,C,D:LINE(A,B)-(C,D)
,PSET
1025 READC,D:IFC=0THEN1020ELSEIF
C=-1THEN1030ELSELINE-(C,D),PSET:
GOTO 1025
1030 FORN=1TO3:READA,B,C,D:LINE(
A,B)-(C,D),PSET:NEXT
1035 POKE178,PC
1040 FORN=1TO7:READ C,D:PAINT(C,
D),,0:NEXT:PSET(192,139,0)
1045 DATA130,0,126,5,125,5,125,4
,123,2,123,4,125,7,122,15,121,15
,121,8,120,8,120,3,119,3,119,13,
120,17
1050 DATA121,20,111,25,111,30,10
8,30,100,35,95,40,94,46,94,50,96
,54,98,58,100,65,100,74,99,74,96
,75,93,71
1055 DATA92,71,88,62,89,60,87,61
,87,56,81,50,75,52,70,48,62,48,6
1,46,61,48,55,48,50,47,49,48,55,
50
1060 DATA53,53,56,54,55,55,52,54
,50,55,45,52,37,51,32,51,26,53,2
0,56,14,61,14,70,13,89,20,105,30
,110
1065 DATA42,106,43,107,45,106,44
,105,48,102,48,97,51,95,57,94,63
,93,66,92,67,94,67,95,64,100,60,
115,59,117
1070 DATA59,119,61,120,80,120,82
,121,85,125,85,127,83,131,83,145
,85,150,95,154,103,151,109,152,1
15,161,117,162,120,160
1075 DATA122,159,124,146,126,143
,132,143,140,137,143,136,144,137
,143,139,141,141,142,145,140,150
,142,152,143,152,144,149,142,146
1080 DATA143,144,152,141,158,143
,161,146,170,146,173,149,180,145
,189,145,189,146,185,147,195,151
,195,155,198,156,200,155,203,160
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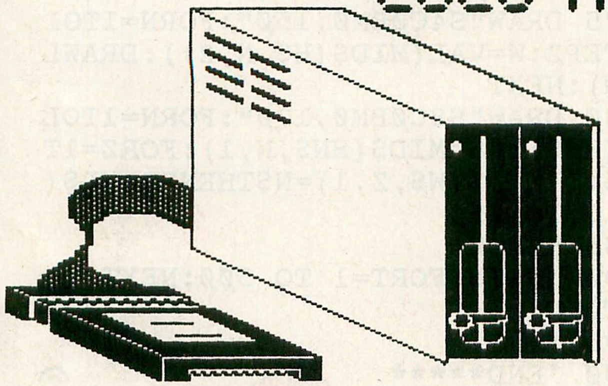

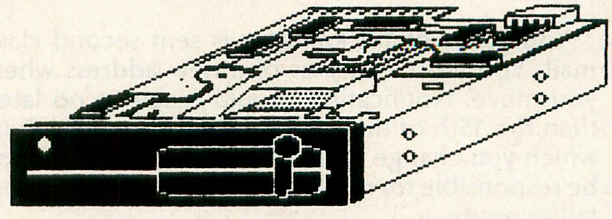

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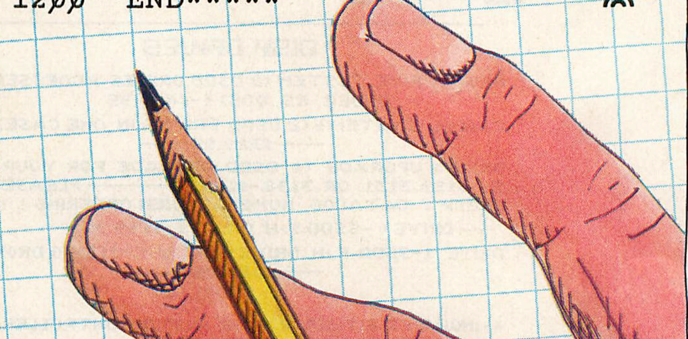
1085 DATA205,165,0,0,0,114,2,115
,20,120,27,118,33,120,40,125,45,
130,50,130,60,134,61,133,63,134,
61,135,71,143
1090 DATA71,148,75,151,76,150,74
,148,82,154,82,155,98,159,100,15
9,103,157,104,157,105,158,113,16
5,0,0,176,38,177,38
1095 DATA177,39,176,39,176,38,0,
0,78,90,81,85,90,83,100,85,104,8
8,106,88,115,91,120,93,122,95,12
5,96,128,97
1100 DATA128,98,130,98,125,100,1
24,99,105,100,113,99,115,97,109,
95,108,93,106,94,102,92,95,90,90
,88,92,87,88,87
1105 DATA83,89,82,88,79,91,78,90
,0,0,93,103,95,103,95,104,93,104
,93,103,0,0,107,108,116,107,119,
109,119,110
1110 DATA110,110,107,109,107,108
,0,0,129,107,137,107,136,102,133
,101,137,107,136,102,133,101,137
,100,150,100,153,104,155,105,159
,107,158,108,152,107
1115 DATA149,109,147,107,143,111
,140,111,140,109,130,109,129,107
,0,0,164,106,170,106,172,107,172
,108,169,109,164,109,164,106
1120 DATA 0,0,91,77,93,77,92,78,
91,78,91,77,0,0,110,74,111,74,11
3,81,112,81,111,79,109,77,109,76
,110,74
1125 DATA0,0,123,22,124,22,124,2
3,123,23,123,22,0,0,191,145,196,
145,195,146,195,148,194,149,191,
149,192,148,192,146
1130 DATA191,145,0,0,202,133,203
,133,203,134,202,134,202,133,-1,
-1,0,115,0,0,0,0,130,0,112,165,2
05,165,5,5,100,87,140,105,167,10
8,110,109,111,77,194,147
1135 '**  DRAW TITLES  **
1140 COLOR0:FORN=0TO144STEP24:LI
NE(212,N)-(250,N+24),PSET,B:NEXT
1145 B=10:X$="":FORN=1TO7
1150 L=LEN(T$(N))
1155 FORZ=1TOL-1STEP2
1160 Z$=MID$(T$(N),Z,2):W=VAL(Z$
):X$=X$+L$(W)
1165 NEXTZ:DRAW"C0BM215,"+STR$(B
)+X$:X$="":B=B+24:NEXTN
1170 DRAW"S4C0BM0,185":FORN=8TO1
2:X$="":L=LEN(T$(N)):FORZ=1TOL-1
STEP2:Z$=MID$(T$(N),Z,2):W=VAL(Z
$):X$=X$+L$(W):NEXTZ:X$=X$+"BR5"
:DRAW"C0BM+4,185"+X$:NEXTN:H$="0
82118180903011405":X$=""
1175 DRAW"S4C0BM0,150":FORN=1TO1
7STEP2:W=VAL(MID$(H$,N,2)):DRAWL
$(W):NEXT
1180 DRAW"S8C0BM0,170":FORN=1TOL
EN(HN$):N$=MID$(HN$,N,1):FORZ=1T
O26:IFMID$(W$,Z,1)=N$THENDRAWL$(
Z):GOTO1190
1185 NEXTZ
1190 NEXTN:FORT=1 TO 500:NEXT T:
RETURN
1195 '
1200 'END*****
```



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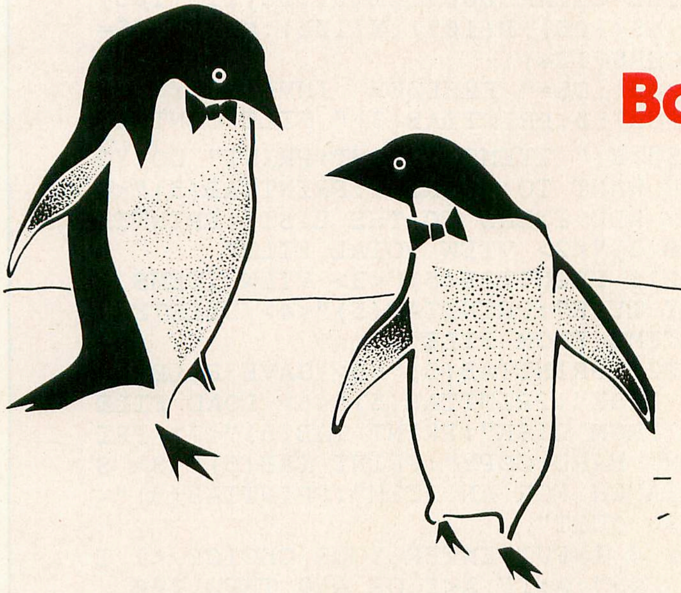


Banishing the Freezer Burn Blues

By Robert Griffard

Some programs have been known to convince the non-computer user of the value of using a computer. The *Freezer* is just such a program. After finding items in the deep freeze that had been there too long and were suffering from freezer burn, my wife accepted the use of this program, on an experimental basis, until it eliminated the problem.

By keeping track of the items being placed in the freezer by date, items can be rotated through deep freeze storage so that the oldest items are removed first. Items placed in the deep freeze are normally marked with contents of the package and date. The only additional marking required for control is a package number; numbers are easier to search for than names when looking for an item.

The program is user-friendly, so that just following the screen instructions allows even the most inexperienced computer user to use the program. The only caution is the category of items must agree with the categories listed in Line 610. Printing the contents by category provides an aid to menu planning.

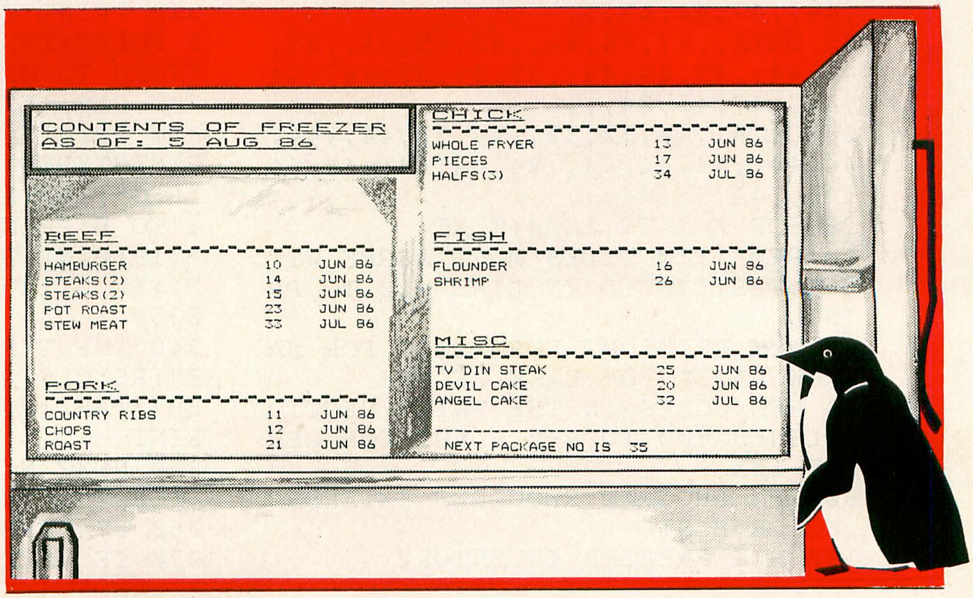
The opening screen, generated by lines 1 to 29, is an example of adding a little pizazz to the program by using the *Title Maker* program by Fred Scerbo in the March 1986 issue.

This program was originally written for the Radio Shack CGP-115. This very capable printer uses 4½ inch wide roll paper. This size proved to be a most convenient size to hang on the side of the freezer, and I still use it with my Gemini 10X printer. The printer codes in lines 630 and 660 are for the Gemini printer and do not establish a page break since roll paper is used. Additionally the type codes used in Line 610 must be used or changed to obtain a print by category of the freezer contents.

The Search for Item function (lines 670-700) uses the `INSTR` instruction so that any item containing the input string will be displayed on the screen. For example, if `ST` is listed as the search string, all items containing this combination of letters will be displayed. You would then see roast, steaks, steamer clams, stew meat, etc.

Different methods have been used to control scrolling of the screen display. Line 330 compares the division of the item number by screen lines with the integer of the division of the item number by screen lines to control scrolling. Lines 390 and 680 count the lines printed to control the scrolling. ☐

Bob Griffard is a retired U.S. Air Force officer. He supervised a large, mainframe computer facility supporting the military command and control function. His current interest is programming the CoCo for home management.



```
CONTENTS  OF  FREEZER
AS  OF:  5  AUG  86

BEEF
-_-_-_-_-_-_-_-_-_-_-_-_-_-_-_-
HAMBURGER                 10    JUN 86
STEAKS(2)                 14    JUN 86
STEAKS(2)                 15    JUN 86
POT ROAST                 23    JUN 86
STEW MEAT                 33    JUL 86

PORK
-_-_-_-_-_-_-_-_-_-_-_-_-_-_-_-
COUNTRY RIBS              11    JUN 86
CHOPS                     12    JUN 86
ROAST                     21    JUN 86

CHICK
-_-_-_-_-_-_-_-_-_-_-_-_-_-_-_-
WHOLE FRYER               13    JUN 86
PIECES                    17    JUN 86
HALFS(3)                  34    JUL 86

FISH
-_-_-_-_-_-_-_-_-_-_-_-_-_-_-_-
FLOUNDER                  16    JUN 86
SHRIMP                    26    JUN 86

MISC
-_-_-_-_-_-_-_-_-_-_-_-_-_-_-_-
TV DIN STEAK              25    JUN 86
DEVIL CAKE                20    JUN 86
ANGEL CAKE                32    JUL 86

----------------------------------------
 NEXT PACKAGE NO IS  35
```

25	8
200	141
300	235
390	26
530	215
600	138
670	198
END	109

The listing: FREEZER

```
1 CLS0:FORI=1TO 416 :READ A:PRIN
TCHR$(A+128);:NEXT
3 DATA,,,,,,,,,,,,,,,,,,,,,,,,,,
,,,,,
5 DATA,,,,,,63,48,48,63,,63,48,6
3,,55,60,59,,60,63,60,,63,60,60,
,,,,,
7 DATA,,,,,,63,54,57,63,,63,60,6
3,,63,60,63,,48,63,48,,60,60,63,
,,,,,
9 DATA,,,,,,52,56,52,56,,60,48,6
0,,60,48,60,,48,60,48,,60,60,60,
,,,,,
11 DATA,,,,,,,,,,84,95,88,,95,91
,80,95,,,,,,,,,,,,,,
13 DATA,,,,,,,,,,80,95,80,,95,84
,91,95,,,,,,,,,,,,,,
15 DATA,,,,,,,,,,84,92,88,,92,80
,84,92,,,,,,,,,,,,,,
17 DATA,,,,,,,,124,127,124,,127,
112,127,,127,124,124,,,,,,,,,,,,
,
19 DATA,,,,,,,,112,127,112,,127,
124,127,,127,124,124,,,,,,,,,,,,
,
21 DATA,,,,,,,,112,124,112,,124,
112,124,,124,124,124,,,,,,,,,,,,
,
23 DATA,,47,44,44,,47,44,47,,47,
44,44,,47,44,44,,44,44,47,,47,44
,44,,47,44,47,,,
25 DATA,,47,44,44,,47,45,34,,47,
44,44,,47,44,44,,35,44,32,,47,44
,44,,47,45,34,,,
27 DATA,,44,32,32,,44,32,44,,44,
44,44,,44,44,44,,44,44,44,,44,44
,44,,44,32,44,,,
29 FOR X=1 TO 1200:NEXT
50 REM ITEM TYPES MUST AGREE WIT
H TYPES LISTED IN LINE 610 TO PR
INT
60 REM PRINTOUT FORMATTED FOR NA
RROW PAPER FOR EASE OF USE
70 REM CODES IN THE PRINT SECTIO
N-LINES 600 TO 660 - ARE FOR GEM
INI 10X
80 REM PROGRAM REQUIRES EXTENDED
 COLOR BASIC
100 REM FREEZER INVENTORY
110 ' BOB GRIFFARD
120 ' 129 STAGE RD.NEWPORT NEWS
VA. 23606
130 ' PHONE (804) 596 8440
140 GOTO740
150 CLEAR3000:DIMT$(105),I$(105)
,M$(105),P(105),Y(105):M=106:Z$=
CHR$(134)
200 ID$=" FREEZER  INVENTORY":GO
SUB750:PRINTTAB(3)" FILE CONTAIN
S";B;" ITEMS":PRINT:PRINT" DO YO
U WANT TO:":PRINT:PRINTTAB(5)"<1
> ADD ITEMS TO THE LIST":PRINTTA
B(5)"<2> VIEW TOTAL FILE"
210 PRINTTAB(5)"<3> VIEW ITEMS B
Y TYPE":PRINTTAB(5)"<4> DELETE I
TEMS FROM FILE"
220 PRINTTAB(5)"<5> SAVE FILE ON
 DISK":PRINTTAB(5)"<6> LOAD FILE
 FROM DISK":PRINT TAB(5)"<7> PRI
NT HARD COPY":PRINT TAB(5)"<8> S
EARCH FOR AN ITEM":PRINTTAB(5)"<
9> QUIT"
230 INPUT"ENTER YOUR CHOICE <1 T
O 9>";A:IF A<1 OR A>9 THEN 200
240 ON A GOTO 250,320,380,450,53
0,570,600,670,760
250 ID$="     ADD  ITEMS":GOSUB7
50:PRINT:PRINT" INPUT DATA AS RE
QUESTED.":PRINT" TO STOP, ENTER
end FOR 'TYPE'."
260 PRINT:B=B+1:IF B=M THEN 310
270 INPUT" TYPE";T$(B):IF T$(B)=
"END"THEN 300
280 INPUT" ITEM";I$(B):INPUT" PA
CKAGE NO";P(B):INPUT" DATE--MONT
H,YEAR";M$(B),Y(B):ID$="      LI
STING":GOSUB750:PRINT"TYPE";TAB(
8)"ITEM";TAB(21)"PKG";TAB(25)"DA
TE":PRINTT$(B);TAB(8)I$(B);TAB(2
1)P(B);TAB(25)M$(B);TAB(29)Y(B)
290 GOTO 260
300 B=B-1:GOTO200
310 PRINT:PRINT"SORRY THE FILE I
S FULL":INPUT"PRESS <ENTER> TO R
ETURN TO MENU";R$:GOTO200
320 CLS:'LIST OF FILE
330 PRINT" CONTENTS AS OF ";D$:P
RINT"TYPE";TAB(10)"ITEM";TAB(19)
"PKG";TAB(25)"DATE":PRINT:FOR N=
1 TO B:PRINTT$(N);TAB(7)I$(N);TA
B(19)P(N);TAB(24)M$(N);TAB(27)Y(
N):IF N/12=INT(N/12) THEN340 ELS
E350
340 INPUT"PRESS<ENTER>TO CONTINU
E";R$:CLS:PRINT"TYPE";TAB(10)"IT
EM";TAB(19)"PKG";TAB(25)"DATE":P
RINT
350 NEXT N:PRINT@448,"<1>=REVIEW
 LISTING  <2>= MENU";
360 F$=INKEY$:IF F$=""THEN360
370 IF VAL(F$)=1THEN320 ELSE 200
```

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```
380 ID$="   ITEMS BY TYPE":GOSUB
750:PRINT:PRINT:INPUT" ENTER ITE
M TYPE TO BE LISTED      ";S$:PR
INT"TYPE";TAB(7)"ITEM";TAB(19)"P
KG";TAB(25)"DATE":V=0:FOR N=1 TO
 B:IF T$(N)=S$THEN390 ELSE 410
390 PRINTT$(N);TAB(7)I$(N);TAB(1
9)P(N);TAB(24)M$(N)TAB(28)Y(N);:
V=V+1:IF V=12 THEN 400 ELSE 410
400 INPUT" PRESS enter TO CONTIN
UE";R$:CLS:V=0
410 NEXT N
420 PRINT@448,"<1>=LIST ANOTHER
TYPE  <2>=MENU"
430 F$=INKEY$:IF F$="" THEN430
440 IF VAL(F$)=1 THEN380 ELSE IF
 VAL(F$)=2 THEN 200 ELSE 420
450 CLS:'DELETE ITEMS
460 ID$="   DELETE  ITEMS":GOSUB
750:PRINT:PRINT" PACKAGE NUMBER
TO BE DELETED    ":INPUT K:FOR X
=1 TO B:IFK=P(X) THEN 480
470 NEXT X:GOTO 490
480 PRINT T$(X); TAB(8)I$(X); TA
B(19)"PKG";TAB(21)P(X); " IS DEL
ETED":Y=X:X=B:NEXTX:FOR N=Y TO B
:T$(N)=T$(N+1):I$(N)=I$(N+1):P(N
)=P(N+1):M$(N)=M$(N+1):Y(N)=Y(N+
1):NEXT N:B=B-1:GOTO 500
490 PRINT"NO PACKAGE NUM. "K" WA
S FOUND"
500 PRINT@448,"<1>=DELETE ANOTHE
R ITEM <2>=MENU"
510 F$=INKEY$:IF F$=""THEN510
520 IF VAL(F$)=1 THEN 450 ELSE 2
00
530 ID$="  SAVE DATA ON DISK":GO
SUB750:PRINT:INPUT " DATE OF FIL
E UPDATE";D$:PRINT:INPUT"DESTINA
TION DRIVE FOR DATA ";DN:DRIVE(D
N):OPEN"O",#1,"FREEZER/DAT":PRIN
T #1,B
540 FOR N=1 TO B:CLS:PRINT@233,"
saving data":PRINT#1,T$(N):PRINT
#1,I$(N):PRINT#1,P(N):PRINT#1,M$
(N):PRINT#1,Y(N):NEXTN
550 PRINT#1,D$:CLOSE#1
560 ID$="      ALL DONE":GOSUB75
0:PRINT:PRINT" DATA HAS BEEN SAV
ED ON DISK.":PRINT:PRINT" PRESS
ANY KEY FOR MENU.":EXEC44539:GOT
O 200
570 ID$=" LOAD DATA FROM DISK":G
OSUB750:PRINT:INPUT"SOURCE DRIVE
 FOR DATA ";DN:DRIVE(DN):PRINT:I
NPUT" PRESS enter WHEN READY";R$
:OPEN"I",#1,"FREEZER/DAT":IF EOF
(1)=-1 THEN 590
580 INPUT #1,B:FOR N=1 TO B:ID$=
"  LOADING DATA FILE":GOSUB750:P
RINT@233,Z$"loading"Z$"data"Z$:I
NPUT #1,T$(N):INPUT#1,I$(N):INPU
T#1,P(N):INPUT#1,M$(N):INPUT#1,Y
(N):NEXT N:INPUT #1,D$
590 CLOSE #1:GOTO200
600 ID$="  PRINT BY CATEGORY":GO
SUB750:PRINT:PRINT " PRINT OF FR
EEZER CONTENTS BY    CATEGORY":P
RINT:INPUT" INPUT TODAYS DATE";E
$:PRINT#-2,CHR$(27)CHR$(87)CHR$(
1):PRINT#-2,CHR$(27)CHR$(45)CHR$
(1)
610 PRINT#-2,"CONTENTS OF FREEZE
R":PRINT#-2,"AS OF: ";E$:F$(1)="
BEEF":F$(2)="PORK":F$(3)="CHICK"
:F$(4)="FISH":F$(5)="MISC"
620 FOR J=1 TO 5:PRINT#-2:PRINT#
-2,CHR$(27)CHR$(87)CHR$(1):PRINT
#-2,CHR$(27)CHR$(45)CHR$(1):PRIN
T#-2,F$(J):PRINT#-2,CHR$(27)CHR$
(87)CHR$(0);:PRINT#-2,CHR$(27)CH
R$(45)CHR$(0);
630 FORX=1TO 18:PRINT#-2,CHR$(23
1);CHR$(232);:NEXTX:PRINT#-2:FOR
 N=1 TO B
640 IF T$(N)=F$(J) THEN 650 ELSE
 660
650 PRINT#-2,I$(N);TAB(23)P(N);T
AB(30)M$(N);TAB(33)Y(N)
660 NEXT N:NEXT J:PRINT#-2:PRINT
#-2,STRING$(40,45):PRINT:INPUT "
 WHAT IS THE NEXT PACKAGE NO";U:
PRINT#-2," NEXT PACKAGE NO IS ";
U:PRINT#-2,STRING$(12,10):PRINT:
PRINT"PRESS enter TO RETURN TO M
ENU":EXEC44539:GOTO 200
670 ID$="  SEARCH FOR ITEM":GOSU
B750:PRINT:INPUT" NAME OF ITEM Y
OU ARE SEARCHING  FOR";S$:P=1:C=
0:V=0:FOR N=1 TO B:F=INSTR(P,I$(
N),S$):IF F=0 THEN 700
680 PRINT T$(N);TAB(8)I$(N);TAB(
25)P(N):C=C+1:V=V+1:IF V=12 THEN
 690ELSE700
690 INPUT" PRESS enter TO  CONTI
NUE";R$:V=0:CLS
700 NEXT N:IF C=0 THEN PRINT:PRI
NT" NO ITEM CALLED "; S$ ;" FOUN
D"
710 PRINT@448,"<1>=SEARCH AGAIN
<2>= MENU"
720 F$=INKEY$:IF F$=""THEN720
730 IF VAL(F$)=1 THEN670 ELSE IF
 VAL(F$)=2 THEN 200 ELSE 710
740 PCLEAR1:GOTO150
750 CLS:PRINT@0,STRING$(6,175);:
PRINT@6,ID$;:PRINT@26,STRING$(6,
175);:PRINT@32,STRING$(32,134);:
ID$="":RETURN
760 CLS:PRINT:PRINT"ARE YOU SURE
 ? y/n":PRINT:INPUT R$:IF R$="Y"
THEN ID$="  HAVE A NICE DAY":GOS
UB750:END:ELSE GOTO 200
```

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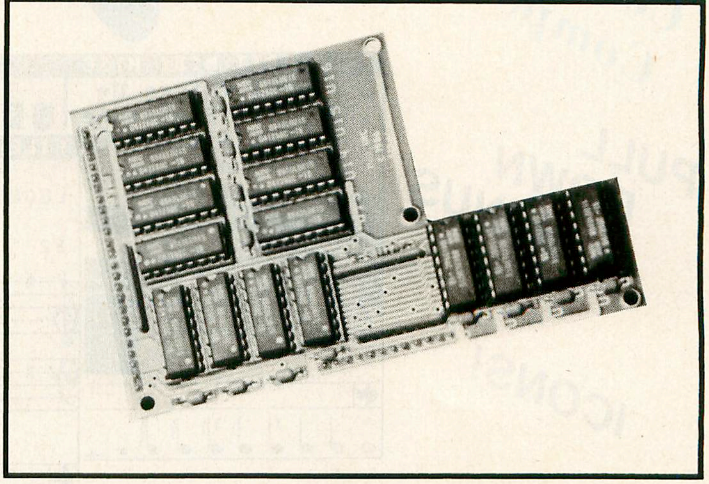
- High Quality Double Sided, Solder Masked, Silkscreened PC Board.
- Ideal for OS9 Level II
- 2 Year Warranty.
- Free GIME Chip Technical Specs ($10.00 without Turbo Ram).
- Free 512K Ram Test Program ($10.00 without Turbo Ram).
- Free MUSICA RAM Disk ($10.00 without Turbo Ram).
- $5 OFF TURBO RAM Disk.
- Also available, TURBO RAM less memory chips. **$69.95**



INSTALLATION

If you know how to hold a screwdriver, we're convinced you can install Turbo Ram in minutes. However, if you like, send us your COCO 3 insured, postage paid, and we will install it, pay the return postage and guarantee it for 1 year. **$15.00**

SATISFACTION GUARANTEED

If for any reason you wish to return Turbo Ram, you may do so within 15 days and be charged only a 10% restocking charge. You may keep the GIME CHIP Technical Specs, 512K Ram Test program and MUSICA RAM DISK, a $30 value.

TURBO RAM DISK

TURBO RAM DISK adds 2 lightning fast Ram Disks to your COCO system. Imagine saving and loading programs instantaneously and having hundreds of your programs "on line" for fast access. Single disk system users can use TURBO RAM DISK to easily make backups without continuously switching disks.

Requires 512K Turbo Charged COCO 3 . . . . **$24.95**
When purchased with TURBO RAM **$19.95**

COCO 3 128K

COLOR CONNECTION IV

This is the most comprehensive modem package for the COCO 3. All standard protocols are supported including CompuServe's Protocol B, XMODEM protocol, and XON/XOFF. Full support of the auto answer/auto dial feature for both Hayes compatible and some Radio Shack modems is provided. Single key macros allow easy entry of often-used passwords and ID's with a single key stroke.

Disk **$49.95**

COLOR SCRIBE III

This great Word Processor can take full advantage of the 80 column display of the COCO 3. Justification, Headers, Footers, and Pagination make it perfect for letters and documents as well as programming in BASIC, PASCAL, "C," and Assembly Language. Over 20 line editing commands include capabilities like character insert and delete, skip over words, breaking a line, and more!

Disk **$49.95**

THE MAGIC OF ZANTH

In the Land of Zanth, magic is commonplace. Dragons, Griffins, Centaurs and Demons abound. You are sent on a quest to discover the source of magic in the Land of Zanth. This intriguing adventure features over 2 dozen hi-res 16 color animated graphic screens, 4 voice music and sound effects. The 16 color, 320 x 192 graphics look great.

Disk **$34.95**

RETURN OF JUNIOR'S REVENGE

This is the same Junior you've seen in the Kong arcade series, but with new COCO 3 graphics. This tireless little monkey must overcome all sorts of obstacles (4 screens worth) to rescue his father, The King, from the mean zookeeper. He will traverse the jungle and swamp, climb vines, avoid chompers and birds, open locks, and more before he finally meets with his big daddy. The 16 color, 320 x 192 graphics are superb.

Disk **$34.95**

We accept CASH, CHECK, COD, VISA and MASTER CARD orders.

Shipping and handling US and Canada	$3.00
Shipping and handling outside the US and Canada	$5.00
COD Charge	$2.00

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Speech Systems

38W255 DEERPATH ROAD
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(312) 879-6880

Introducing

Lyra™

The Musical Coco Max™

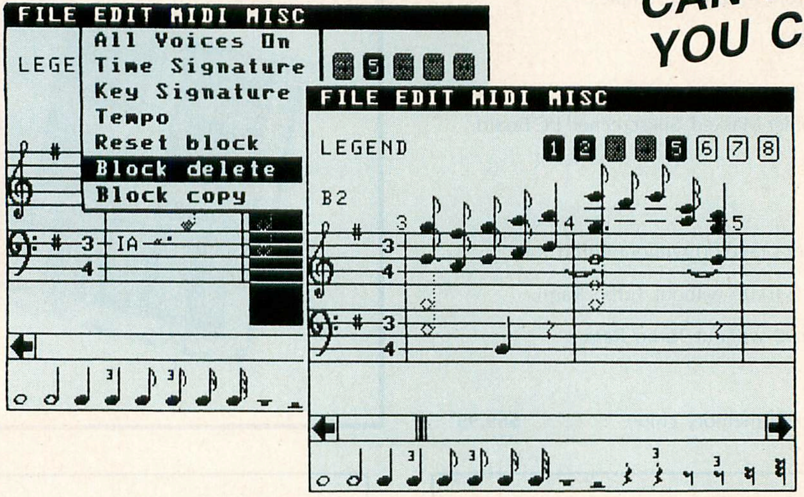
CoCo 3 Compatible

IF YOU CAN POINT, YOU CAN COMPOSE

PULL DOWN MENUS

ICONS!

A MUST FOR MIDI USERS



LYRA is the most powerful music composition program we have seen on any computer. We don't mean just the COCO, we really mean any computer. Whether you are a novice trying to learn music or a professional musician with MIDI equipment you will find LYRA a powerful tool. You see, we wrote LYRA for musicians that hate computers. If you want proof, purchase a LYRA demo for $7.95. We will apply the demo price to your purchase. MIDI output requires the LYRA MIDI cable (#MC158) or COCO MIDI Seq/Editor (#CM147).

- Ultra Easy to use, just point with joystick or mouse and click.
- Compose with up to 8 completely independent voices.
- Room for over 18,000 notes. (This is not a misprint!)
- Super Simple Editing Supports:
  - Note insert
  - Note delete
  - Note change
  - Block insert
  - Block delete
  - Block copy
- Output music to:
  - TV Speaker
  - STEREO PAK
  - SYMPHONY 12
  - MIDI Synth
  - Monitor Speaker
  - ORCHESTRA 90
  - COCO MIDI S/E
  - MIDI Drum Machine
- Output up to 4 voices without additional hardware.
- Output all 8 voices using either SYMPHONY 12 or one or more MIDI synthesizers and drum machines.
- Output any voice on any of the 8 MIDI channels.
- Transpose music to any key.
- Modify music to any tempo.
- Automatically inserts bar for each measure as you compose.
- Key signature lets you specify sharps and flats only once, LYRA will do the rest.
- Plays MUSICA 2 files using LYRA CONVERT (#LC164).
- Each voice may be visually highlighted or erased.
- Each measure is numbered for easy reading.
- Solo capability
- Block edits are highlighted.
- Tie notes together for musical continuity.
- Name of note pointed to is constantly displayed.
- Jump to any point in the score instantaneously.
- Memory remaining clearly displayed, however you will have plenty of memory even for the most demanding piece.
- Help menu makes manual virtually unnecessary.
- LYRA is 100% software, no need for extra hardware unless you want more power.
- Music easily saved to tape or disk.
- Requires 64K and mouse or joystick.

LYRA (Disk only) #LY122 .... **$54.95**

LYRA OPTIONS

These LYRA options are **not** required. They are provided for those wishing additional flexibility.

LYRA CONVERT

A program to convert MUSICA 2 files to LYRA files.
(T or D) #LC164 .... **$14.95**

LYRA STEREO ENHANCER

Gives the LYRA stereo output when used with the STEREO PAK or ORCHESTRA 90.
(T or D) #LS149 .... **$14.95**

LYRA MIDI CABLE

A cable to connect your computer to your MIDI synthesizer.
#MC158 .... **$19.95**

LYRA SYMPHONY 12 ENHANCER

Lets LYRA play all 8 voices through SYMPHONY 12.
(T or D) #LS177 .... **$19.95**

STEREO PAK

Plugs into the COCO ROM cartridge slot allowing easy connection to your stereo system.
#SP193 .... **$39.95**

SYMPHONY 12

A real hardware music synthesizer, lets LYRA play all 8 voices in stereo.
(T or D) #SY149 .... **$69.95**

COCO MID Seq/Editor

A professional quality MIDI interface for MIDI synthesizers.
(Disk only) #CM147 .... **$149.95**

MUSIC LIBRARY

A collection of over 800 songs. When used with CONVERT, it gives an incredible LYRA library. Each volume 100 songs.
(T or D) #MLXXX **$29.95**

COCO MAX is a trademark of Colorware.
ORCHESTRA 90 is a trademark of Radio Shack.

We accept CASH, CHECK, COD, VISA and MASTER CARD orders.

Shipping and handling US and Canada	$3.00
Shipping and handling outside the US and Canada	$5.00
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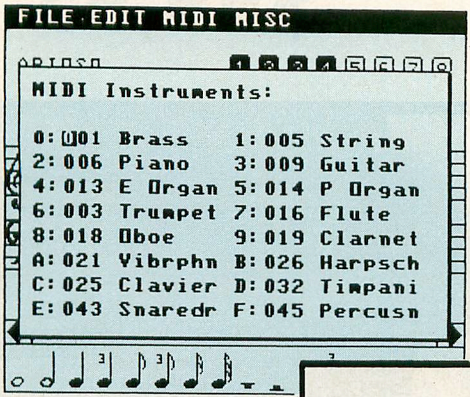

```
MIDI Instruments:

0:001 Brass     1:005 String
2:006 Piano     3:009 Guitar
4:013 E Organ   5:014 P Organ
6:003 Trumpet   7:016 Flute
8:018 Oboe      9:019 Clarnet
A:021 Vibrphn   B:026 Harpsch
C:025 Clavier   D:032 Timpani
E:043 Snaredr   F:045 Percusn
```

Introducing

CoCo 3 Compatible

COCO MIDI 2

Lyra COMPATIBLE!

MORE FEATURES!

MORE POWER!

Now your COCO can talk to your MIDI music synthesizer. Whether you have a Korg, Roland, Casio, Yamaha, or Moog, it doesn't matter as long as it's MIDI equipped. Choose from our entry level MUSICA MIDI system that plays MUSICA files or our Professional COCO MIDI 2 system.

- ✓ Supports 16 Track recording and playback.
- ✓ Adjustable tempo.
- ✓ Over 45 Kbytes available (Over 15,500 MIDI events possible).
- ✓ Record to any track.
- ✓ Low Level track editing.
- ✓ LYRA editing. (one voice per track).
- ✓ Playback from any number of tracks.
- ✓ Quantizing to 1/16, 1/32, 1/64 intervals.
- ✓ Filter out MIDI data:
  - Key pressure
  - Program change
  - Pitch wheel
  - Control Change
  - Channel Pressure
  - System Message
- ✓ Graphic Piano Keyboard Display in both record and playback mode.
- ✓ Adjustable Key (Transposition).
- ✓ Save recording to disk for later playback or editing.
- ✓ Syncs to drum machine as MASTER or SLAVE.
- ✓ Sequencer features.
- ✓ 100% machine code.
- ✓ "Musician Friendly" Menu Driven.
- ✓ Metronome
- ✓ Many songs included.

Includes MIDI hardware interface, 2 MIDI cables, detailed manual, and software. Requires 64K CoCo, Y-Cable or Multi-Pak.

COCO MIDI 2 (disk only) #CM147 . **$149.95**
DOUBLE Y-CABLE #DY181 . . . . . . **$28.95**
TRIPLE Y-CABLE #TY173 . . . . **$34.95**

DX LIBRARIAN™

Save and load voice parameters for the Yamaha DX series of synthesizers (DX-7, DX-100, DX-21 etc.). Save sounds individually or as a group letting you load the entire synthesizer in seconds. Comes with professionally developed voices for the DX-7 worth 10 times the price. Requires COCO MIDI hardware interface.

DX LIBRARIAN (Disk only) #DX143 . . . . $39.95

CASIO LIBRARIAN

Save and load voice parameters for any Casio synthesizer (CZ-101, CZ-1000, CZ-5000 etc.) You can save from the: presets, cartridge, memory or buffer. Requires COCO MIDI hardware interface.

CASIO LIBRARIAN (Disk only) #CL169 . . . . **$39.95**

MUSICA MIDI™

MUSICA MIDI takes any MUSICA 2 music file and plays it through your MIDI synthesizer. We offer you over 800 tunes from our MUSIC LIBRARY series (sold separately) or create your own music using MUSICA 2. Inlcudes: documentation, plenty of music, and the cable to connect between the COCO and your synthesizer.

MUSICA MIDI Complete (Disk Only) #CM126 . . . . . . **$39.95**

MIDI KEYBOARD

If you own the Casio CZ-101 or similar MIDI synth, you know that the mini keys and the short 3 or 4 octave keyboard is limiting. MIDI KEYBOARD when used with our full size 5 octave keyboard gives you the flexibility you need. Comes with cable to connect the COCO to your MIDI synth.

MIDI KEYBOARD (Disk only) #MK167 . . . . **$29.95**

Now Your Computer Can Listen To You!

EARS™

Electronic
Audio
Recognition
System

$99.95

CoCo 3 Compatible

- **SPEECH RECOGNITION**
- **HANDS OFF PROGRAMMING**
- **HIGH QUALITY SPEECH REPRODUCTION**

EARS Does It All!

INCREDIBLE!

Two Years In the Making. Speech Systems was formed to develop new and innovative speech products. After 2 years of intensive Research and Development, we have created a truely sophisticated speech recognition device. Recognition rates from 95% to 98% are typical. Until now, such a product was outside the price range of the personnel computer market, and even small businesses.

EARS is trained by your voice and capable of recognizing any word or phrase. Training EARS to your particular voice print takes seconds. Up to 64 voice prints may be loaded into memory. You may then save on tape or disk as many as you like so that your total vocabulary is virtually infinite.

Speech and Sound Recognition. EARS is really a sound recognition system, so it really doesn't matter whether you speak in English, Spanish, or French. In fact you do not have to speak at all, you can train EARS to understand sounds such as a musical note or a door slamming.

Hands Off Programming. Imagine writing your own BASIC programs without ever touching the keyboard. Everything that you would normally do through a keyboard can now be done by just speaking.

Programming EARS Is Easy. LISTEN, MATCH and other commands have been added to BASIC so that programming EARS is a piece of cake! The single BASIC line: 10 LISTEN: MATCH will instruct EARS to listen to you and return the matching phrase.

It Talks. EARS is also capable of high quality speech. We mean REALLY high quality. The speech is a fixed vocabulary spoken by a professional announcer. Speech Systems is currently creating a library of thousands of high quality words and phrases. For a demonstration call **(312) 879-6844**, you won't believe your ears or our EARS.

DISK OWNERS. EARS will work with any disk system with either a MULTI-PAK or Y-CABLE. Our new Triple Y-CABLE was specifically developed for those wishing to add SUPER VOICE as a third device.

You Get Everything You Need. You get everything you need including a specially designed professional headset style noise cancelling microphone. The manual is easy to use and understand. Several demonstration examples are included so you don't have to write your own programs unless you want to. EARS will work in any 32K or 64K Color Computer.

SUPER VOICE $20 OFF

Imagine talking to your computer and it talking back to you. When you need an unlimited vocabulary, you can't beat SUPER VOICE. For a limited time, we will give you the SUPER VOICE for $59.95 with your EARS purchase. Even if you already have another speech unit, here is your chance to buy the best and save $20.

VOICE CONTROL

Applications for EARS are astounding. Here is our first of many listening programs to come. VOICE CONTROL is a program specifically designed to allow you to control any appliance in your house with your voice and our HOME COMMANDER (sold separately) or the Radio Shack Plug 'N' Power controller. For example, you can control your TV by saying "TV ON" or "TV OFF". . **$24.95**

FREE BLANK DISK OR TAPE WITH EVERY ORDER

VISA® MasterCard

Dealer Inquiries Invited

We accept CASH, CHECK, COD, VISA and MASTER CARD orders.

Shipping and handling US and Canada	$3.00
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'SUPER VOICE'

T.M.

COCO'S MOST ADVANCED SPEECH SYNTHESIZER.

IT TALKS, SINGS AND MORE.

only . . . $79.95

WITH EARS PURCHASE

only . . . $59.95

musical applications of microprocessors

CoCo 3 Compatible

SUPER VOICE is no ordinary speech synthesizer. It uses Silicon Systems, Inc. SSI-263, the most advanced speech/sound chip available. SUPER VOICE is not only capable of highly intelligible speech, sound effects, and singing over a 6 octave range, but now we have turned SUPER VOICE into a monophonic Super Music Synthesizer with our PIANO KEYBOARD.

IT TALKS. A free TRANSLATOR text-to-speech program makes writing your own talking program as easy as SAYING "HELLO."

SUPER VOICE works in any 32K or 64K computer. A disk system requires a Y-Cable or Multi-Pak.

Here are the facts; the decision is yours.

	SUPER VOICE	REAL TALKER	RS SPEECH CARTRIDGE	VOICE-PAK
Synthesizer Device	SSI-263	SC-01	SP-256	SC-01
Speaking Speeds	16	1	1	1
Volume Levels	16	1	1	1
Articulation Rates	8	1	1	1
Vocal Tract Filter Settings	255	1	1	1
Basic unit of Speech	64 phonemes 4 durations each	64 phonemes	64 allophones 5 pause lengths	64 phonemes
Pitch Variations	4096 (32 absolute levels with 8 inflection speeds)	4	1	4

FREE "REACTION" To Test Your Reflexes

FREE SUPER VOICE SINGS THE STAR SPANGLED BANNER

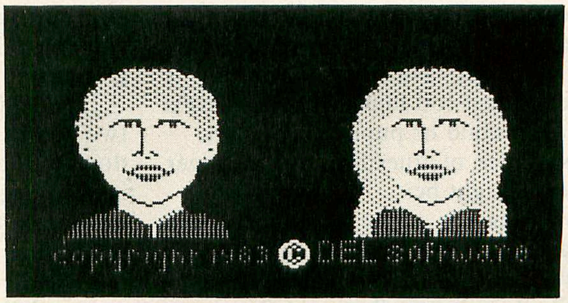
FREE "SIMON" To Test Your Memory

SAVE $24.95

FREE

SUPER TALKING HEADS

Paul and Pauline, our talking heads program is normally $24.95. Until Dec. 15 we will include them with each SUPER VOICE order.



FREE BLANK DISK OR TAPE WITH EVERY ORDER

VISA MasterCard

Dealer Inquiries Invited

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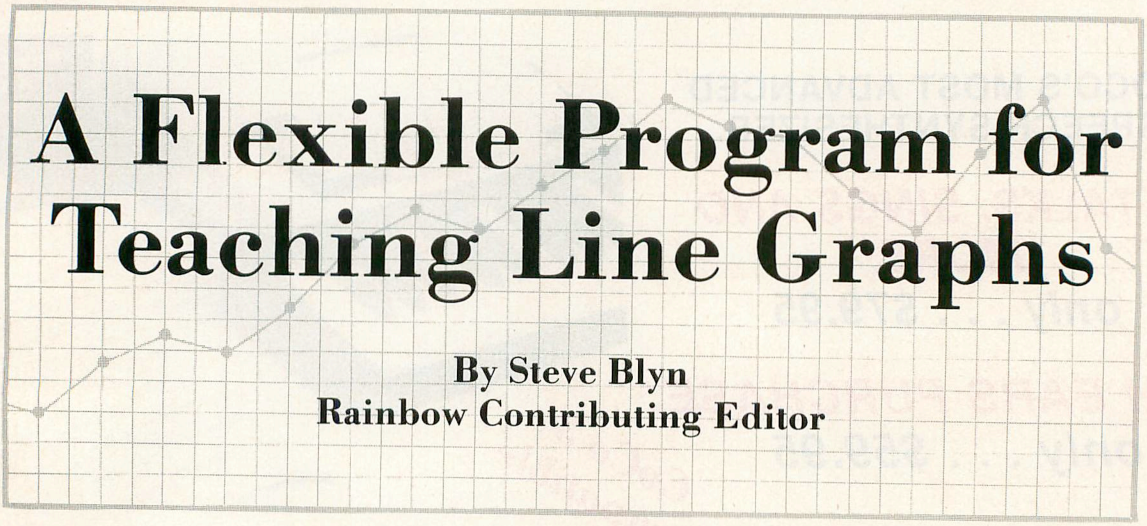
1 MEGABYTE COLORAMA

CALL ANY DAY TO ORDER. ALSO ORDER BY MAIL OR BBS.

EDUCATION NOTES

16K
ECB



A Flexible Program for Teaching Line Graphs

By Steve Blyn
Rainbow Contributing Editor

Graphs are one of the more interesting yet often confusing topics in mathematics. They appear in many of the standardized math tests that youngsters are required to take. Graphs are an important part of any consumer's education. Newspapers, especially, contain many examples of all types of graphs that should be studied and understood.

This program is an aid in learning to understand line graphs. The program will generate endless line graphs for you to use as you see fit. The last line in the program will permit you to save any of the graphs on your disk system. You may also print out any graphs generated if you have a screen print program.

Although several of the values are given after each graph has been drawn, there are no formal questions asked by this program. The reason for this is there are just too many different levels that your child or pupils may be on.

Examples of questions for younger students might be:

1) What is the value of each of the variables?
2) Which is the greatest value?
3) Which is the smallest value?

Examples of questions for middle grade students might be:

1) What is the difference between the highest and the lowest values?
2) Which is the second highest or second lowest value?
3) Arrange the values in ascending or descending order.

Examples of questions for older students might be:

1) What is the mean?
2) What is the median value?
3) Any other statistical operation you desire to teach or test.

Lines 50 through 90 contain the program's opening screen. The user may either press ENTER to see a graph or press E to end the program. After pressing ENTER, lines 120 through 460 will draw a graph. All of the variables will be in multiples of five to make computing the values easier for all students. The values will be random. No graphs will be identical.

Lines 200 through 240 ensure that no two scores will be the same. This was done so that questions such as, "Which is the largest value?" have only one answer. If this does not suit your purposes, then merely shorten these lines to remove the `IF` statements. You will then randomly have repeats in the variables' values.

Lines 500 through 640 contain the strings to draw the numbers and letters. The numbers one through seven are needed for the value amounts zero to 70 and the letters A though F are used as the variable names.

After the graph is drawn, the child may answer any of your questions. When the ENTER key is pressed, the computer will display the amount of each variable and the average (mean) of the scores. These values may be computed by the children while the graph is still displayed. These values can be used as questions to be answered if you choose not to make up any of your own questions or if the child is using the computer alone at this time.

You are therefore free to have the child answer the questions that the computer suggests through the list of graph data, or answer any preset questions of your own design. Lines 680 through 730 compute the value of each of the variables. A2 to F2 are the amounts of the variables. "AV" is the average of them. Please feel free to use these variables to help alter this program to suit the needs of your children.

If you are using a disk drive on your CoCo system, any of the graphs may be saved to your disk. The time to save the picture is while it is still being displayed on the screen. Press the S key and this graph will be saved as `GRAPH1.BIN`. If you want to save more graphs, you must change the name of the next graph so it does not overwrite the first one. Change the name in Line 850 to `GRAPH2` and the next to `GRAPH3`, and so on.

If you want to view any of your graph pictures in the future, merely enter the following program:

```
10 PCLS5:PMODE 3, 1:SCREEN 1, 1
20 LOADM"GRAPH1.BIN"
30 GOTO 30
```

Then type `RUN`.

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

Almost any screen print program will be able to give you a hard copy of these graphs. We hope you and your children enjoy working with line graphs. We at Computer Island always enjoy hearing from our readers. ☐

The listing: GRAPHS

```
10 REM"LINEGRAPHS"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,STATEN ISLAND,NY,1987"
30 CLEAR2000
40 GOSUB 500
50 CLS:PRINT@11,"LINEGRAPHS";
60 PRINT@96,"PRESS ENTER TO SEE
SEE THE GRAPH
             AND PRESS ENTER AGA
IN TO RETURN."
70 PRINT@160,"AND PRESS ENTER AG
AIN TO RETURN."
80 PRINT@40,STRING$(16,255);
90 PRINT@419,"PRESS THE 'E' KEY
TO END";
100 EN$=INKEY$
110 IF EN$=CHR$(13) THEN 120 ELS
E IF EN$="E" THEN 830 ELSE 100
120 PCLS5:SCREEN1,1:PMODE3,1:CIR
CLE(90,90),10
130 PCLS5:SCREEN1,1:PMODE3,1:COL
OR7
140 LINE(25,170)-(240,172),PSET,
BF
150 LINE(25,15)-(27,170),PSET,BF
160 COLOR8:FOR T=30 TO 150 STEP
20
170 LINE(27,T)-(235,T),PSET
180 NEXT T
190 A=40:A1=(3+RND(12))*10
200 B=75:B1=(3+RND(12))*10:IF B1
=A1 THEN 190
210 C=110:C1=(3+RND(12))*10:IF C
1=A1 OR C1=B1 THEN 190
220 D=145:D1=(3+RND(12))*10:IF D
1=A1 OR D1=B1 OR D1=C1 THEN 190
230 E=180:E1=(3+RND(12))*10:IF E
1=D1 OR E1=C1 OR E1=B1 OR E1=A1
THEN 190
240 F=215:F1=(3+RND(12))*10:IF F
1=A1 OR F1=B1 OR F1=C1 OR F1=D1
OR F1=E1 THEN 190
250 COLOR8
260 CIRCLE(A,A1),2
270 CIRCLE(B,B1),2
280 CIRCLE(C,C1),2
290 CIRCLE(D,D1),2
300 CIRCLE(E,E1),2
310 CIRCLE(F,F1),2
320 COLOR6:LINE(A,A1)-(B,B1),PSE
T
330 LINE-(C,C1),PSET
340 LINE-(D,D1),PSET
350 LINE-(E,E1),PSET
360 LINE-(F,F1),PSET
370 DRAW"BM45,175;C7A2S12"+A$+SP
$+B$+SP$+C$+SP$
380 DRAW D$+SP$+E$+SP$+F$
390 DRAW"BM6,22;C8S8"+Z7$+O$
400 DRAW"BM6,42"+Z6$+O$
```

Hint . . .

Rainbow Check PLUS Fix

If you are using a *Word Pak I* or *II* under Disk BASIC (EPROM version), you can also use the *Rainbow Check PLUS*. However, in order to get the checksum displayed, you must press the space bar before pressing the down arrow key. This is because of the full screen editor in the *Word Pak*. If you just pressed the down arrow key, the cursor would simply move down one line. But, this only occurs if the down arrow key is pressed as the first character on a line. By pressing the space bar, you eliminate this problem.

Greg Law
(GREGL)
Columbus, GA

One-Liner Contest Winner . . .

Payout will compute your monthly payments on any loan based on the loan amount, interest rate and period of the loan.

The listing:

```
10 CLS:INPUT"AMOUNT FINANCED";A:
INPUT"INTEREST RATE";I:INPUT"MON
THS FINANCED";M:P=A*I/1200/(1-1/
((1+(I/1200))^M)):R=P*100:S=FIX
(R):V=S/100:PRINT"MONTHLY PAYMEN
TS";V
```

Rick A. Walter
Eielson AFB, AK

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape*.)

```
410 DRAW"BM6,62"+Z5$+O$
420 DRAW"BM6,82"+Z4$+O$
430 DRAW"BM6,102"+Z3$+O$
440 DRAW"BM6,122"+Z2$+O$
450 DRAW"BM6,142"+Z1$+O$
460 DRAW"BM20,162"+O$
470 EN$=INKEY$
480 IF EN$=CHR$(13) THEN 670 ELS
E IF EN$="S" THEN 850 ELSE 470
490 REM"THE STRINGS FOR THE LETT
ERS AND NUMBERS FOLLOW"
500 A$="BEHUNU2R4NU2DGL2BGBL6"
510 B$="BEHENR3HER3D4L3BGBL6"
520 C$="BU4ER2FD2GL2HBG2BL4"
530 D$="BEHU2ER3D4L3BGBL6"
540 E$="BER3U2NL2U2L4BG5BL2"
550 F$="BUR4U2NL3U2BG5BL5"
560 O$="BEHU2ER2FD2GL2BGBL6"
570 Z1$="BE2NU3DEBFBGBL9"
580 Z2$="BENR3HER3U2L4BG5BL"
590 Z3$="BENR3HENR2HER3BG5BL5"
600 Z4$="BENU4E3L4BG4BL2"
610 Z5$="BER4U2L3HER3BG5BL5"
620 Z6$="BU2FR2EU2NHGL2HER2BG5BL
4"
630 Z7$="BUNR4UE3BG5BL4"
640 SP$="BE4BUBG5BL5"' ***SPACER
650 RETURN
660 REM"COMPUTE AND PRINT THE AN
SWERS"
670 CLS:PRINT"     HERE ARE THE
RESULTS":PRINT
680 A2=(-A1/2)+85
690 B2=(-B1/2)+85
700 C2=(-C1/2)+85
710 D2=(-D1/2)+85
720 E2=(-E1/2)+85
730 F2=(-F1/2)+85
740 PRINT"A="A2,"B="B2
750 PRINT"C="C2,"D="D2
760 PRINT"E="E2,"F="F2
770 AV=(A2+B2+C2+D2+E2+F2)/6
780 AV=INT(AV+.5)
790 PRINT@229,"THE AVERAGE WAS "
AV
800 PRINT@456,"PRESS G TO GO ON.
";
810 EN$=INKEY$
820 IF EN$="G" THEN RUN ELSE 810
830 CLS:END
840 REM"SAVING THE PICTURE OF TH
E GRAPH"
850 SAVEM"GRAPH1",3584,9727,3584
:GOTO 670
```

From the Princeton RAINBOWfest . . .

The CoCo 3 Round-Table Tape!

YES, Please send me ________ copies of the "CoCo 3 Round-Table Tape" at $5 per copy plus $1.50 S/H for a total of ________.
(U.S. Currency *only*, please.)

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Exp. Date ________________
Signature ________________

Make checks payable to The Rainbow. Mail to CoCo 3 Round-Table Tape, The Rainbow, P.O. Box 385, Prospect, KY 40059. To place credit card orders, call our toll-free number: (800) 847-0309.

THE RAINBOW recorded the main event of RAINBOWfest Princeton, the Saturday evening (Oct. 18) round-table discussion:

"The Design, Development and Marketing of the CoCo 3."

Speakers included Tandy's Barry Thompson and Mark Siegel, as well as independent CoCo 3 programmers Steve Bjork and Dale Lear (filling in for Greg Zumwalt).

This was a lively and informative session and, therefore, we want as many people as possible to hear what these RAINBOWfest guests had to say.

Also from the Rainbow makers . . .

SOFT SECTOR

The PC Compatible Magazine

Not long ago, the alphabet of the world of MS-DOS computers was dominated by only three letters: I, B, M. We saw them everywhere. They stood for a great standard in personal computers, but they also spelled something else: high prices and a conservative lack of innovation.

Today things have changed. With Tandy, Compaq, ALR, Leading Edge, Victor and dozens of others, the list of PC Compatibles stretches from A to Z. With lower prices and improved performance, these are the machines that have truly made the PC a "personal" computer.

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- Useful, practical hints and tips to help you get the most from your computer with the least frustration.
- A wealth of programs that can be typed in and run on your computer: utilities, home and business applications, games and graphics. And a companion disk service (available separately) for those who simply don't have the time to type those great programs in.
- A spotlight on the best product of the month, chosen by our editors as the most useful, the most innovative, and the one you should seriously consider adding to your collection.

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MAIL TO: SOFT SECTOR, The Falsoft Bldg., P.O. Box 385, Prospect, KY 40059 R487

Screen Star

New Screen Editor with Smart Speller!

This is the screen editor everyone has been waiting for! Screen Star is clearly the most powerful editing product ever available on the Color Computer.

WordStar Implementation

What makes it so powerful? Screen Star implements the popular WordStar editing capabilities. If you know or use WordStar on any other computer, you already know how to use Screen Star on your CoCo! Plus, what you learn with Screen Star you can use on nearly any other computer you use later.

Edit Files Larger than Memory

Since Screen Star uses the disk as an extension of memory, it will edit files larger than memory. You are not confined to small text or program files!

Block Commands

With a keystroke you can mark the start and end of a block, then move, copy, or delete the block with another keystroke.

Cursor Movement

An array of powerful cursor commands help you to move left or right one character, or one word, or one line; scroll forward or back one line, one screen, one block; jump to the start or end of the line or the screen, block or file.

Find & Find/Replace Commands

Full implementation of find and find/replace commands make mass changes and searches a snap. This is so time saving when programming or word processing!

Parameter Commands

Personalize your editing environment using the paramenter commands. Set tabs, toggle the video, access the OS-9 Shell, and choose wordwrap. CoCo 3 users can define up to 10 functions keys for fast, repetitive functions.

Pop-Up Help Menus

Help is as close as a keystroke. At any time you can bring up a concise list of commands and functions to help you use Screen Star's full capabilities.

Closing Commands

Not only can you exit the editor with or without save, but you can import or export files whenever you need them.

Smart Speller Included

Smart Speller is included in the package too! This is a revolutionary new idea in spelling checker programs. Unlike most spelling checkers which require a huge dictionary file containing every word you ever wish to use, Smart Speller utilizes a relatively small dictionary which contains the most common English misspellings and their correct spellings. This makes Smart Speller much easier to use, since it will not stop at every word and requires much less space.

Smart Speller will also recognize any abbreviations you commonly use and replace them with their full spellings automatically! This feature alone can save you countless hours of typing time.

Use with Text Formatter

Screen Star works especially well with Computerware's OS-9 Text Formatter to provide a full word processing team. You simply imbed the Text Formatter commands in your Screen Star file. It will then be printed in style with headers, footers, pagination, justification, etc. We offer a special package price for this powerful duo!

Level 1 for CoCo 1 and CoCo 2

Screen Star uses OS-9. All Color Computer are supported under Level 1. A special 51 x 24 screen driver is provided (and required) to make available the added screen capabilities. 10 functions keys are available to all users.

Level 2 and CoCo 3

CoCo 3 users can run Screen Star with either Level 1 or Level 2. Level 2 offers extended capabilities for scrolling and display features on an 80 x 24 screen.

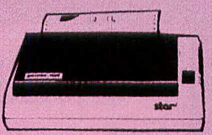
All versions included

All versions are included in the Screen Star package, so you can enjoy its power on any CoCo you use!

Requires OS-9	**$49.95**
With Text Formatter (Save $10)	**$74.95**

Call or write for your FREE Computerware Catalog

OS-9 Text Formatter



OS-9 Text Formatter interfaces with any editor that produces standard ASCII text files including Computerware's Screen Star, and Radio Shack's TS Edit.

Supports:

- Right & Left Justification
- Automatic Pagination
- Headers and Footers
- Macros, Tabs, Etc.
- Page numbering & Auto Date Insert
- Send ESC & CTL codes to printer

Why just print it when you can FORMAT it with OS-9 Text Formatter.

Requires OS-9	**$34.95**

We've combined our 2
most popular OS-9 packages

Save $15

Disk Fix +
Advanced Utilities COMBO

DISK FIX supports true double-sided/double density, 40 tracks, and step rates up to 6 ms. KSHELL allows wildcards with any utility along with pathing. DMODE allows easy drive descriptor modifications. DIRCOPY copies complete disks with one command, any subdirectory, sorts directory, replaces updated files with current ones, etc. PATCH is a very user-friendly program for inspecting and modifying any disk file. ARCHIVE backs up large disk media onto small disk media. Also includes FILELOOK, COMPARE, UNLOAD, FLINK, and CPY. Also available from Radio Shack Express Order Software. Catalog #900-0900.

Requires OS-9	**$49.95**

OS-9 Connection 3.0

The best in communication software is now available for the OS-9 user. OS-9 Connection works on either Level 1 or Level 2 CoCo OS-9. All of the standard protocols are supported including CompuServe Protocol B, XMODEM, and XON/XOFF. The dial feature for Hayes compatible and some Radio Shack modems is supported. You are able to print directly from the buffer, and files bigger than the buffer can be uploaded and downloaded. Macros allow easy entry to often-used passwords and ID's. Includes a 51 x 24 hi-res screen, but will work with any OS-9 display. OS-9 Connection supports baud rates up to 1200 out the back RS232 port or higher with the RS232 pak. Communicate with confidence with OS-9 Connection 3.0.

Requires OS-9 **$49.95**

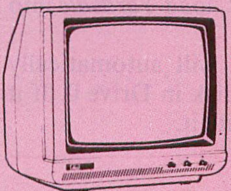
Color Connection — RSDOS

The #1 communications package for RSDOS users. Works on CoCo 1, 2, or 3. Also Available from Radio Shack Express Order Software. Catalog #900-0348.

RSDOS Disk **$49.95**

Mitsuba 1200 Modem $159.00

Monitors



These 12" NAP monochrome monitors provide 20 mhz band width, 800 line resolution, 80 x 25 display, and has audio input.

Green or Amber display

$114.95

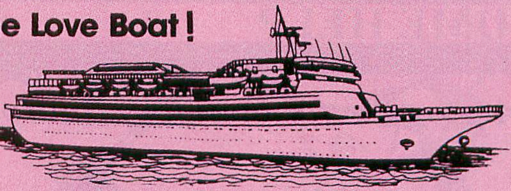
plus shipping $5.00

Universal Video Plus

Interfaces any CoCo 1 or Co Co 2 with a color or monochrome composite video monitor.

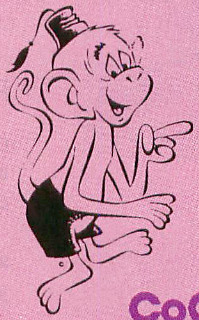
$34.95

Nuke the Love Boat!



Your pleasure cruise has just turned into adventure on the high seas. This strategy simulation is a race against time and all the odds. Can you and the crew stop Abdul Mullah before he nukes the Love Boat? It is up to you to get the bomb out of terrorist hands. The entire ship and its crew will become involved. Doc, Julie, Issac, and Gopher will help you as the battle takes you from the pool side, to the dining room, to every deck on the ship. This simulation is fully mouse/joystick driven with pull down menus and windows. It takes full advantage of the CoCo 3's graphics. If your CoCo has 512K, it will be used as a fast ramdisk. Good luck! Don't let them Nuke the Love Boat!

Requires CoCo 3, mouse or joystick, disk **$34.95**



Return of Junior's Revenge

Designed to take advantage of the CoCo 3's 320 x 192 16-color display. It brings the ever popular arcade game Donkey Kong Jr. to life on the CoCo 3.

Req. CoCo 3, Disk, joystick **$34.95**

CoCo 3 Graphics!

The Magic of Zanth

You are on a journey to discover the source of magic in the land of Zanth. Dragons, Griffins, Centaurs, and Demons abound. This intriguing adventure features over 2 dozen 320 x 192 hi-res 16 color animated graphic screens.

Requires CoCo 3, Disk **$34.95**
(SSC pak optional)

save over $50

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512K Memory Expansion
ONLY $99.50

512K Memory Expansion for CoCo 3

Completely assembled with prime 120ns memory chips, this board is easy to install. Complete instructions are included.

April Special $99.50

CoCo 3 Ramdisk and 512K Diagnostics

Ramdisk creates two additional drives that can be configured as 0 & 1, or 2 & 3. Programs speed up significantly when run from a ramdisk! Memory Diagnostics test memory 3 ways. Copy Utility makes organizing disks a cinch.

Requires CoCo 3, 512K, RSDOS **$19.95**

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A program for inventory control — prints price tags, too!

CoCo Presents The Well-Behaved Yard Sale

By Eric White

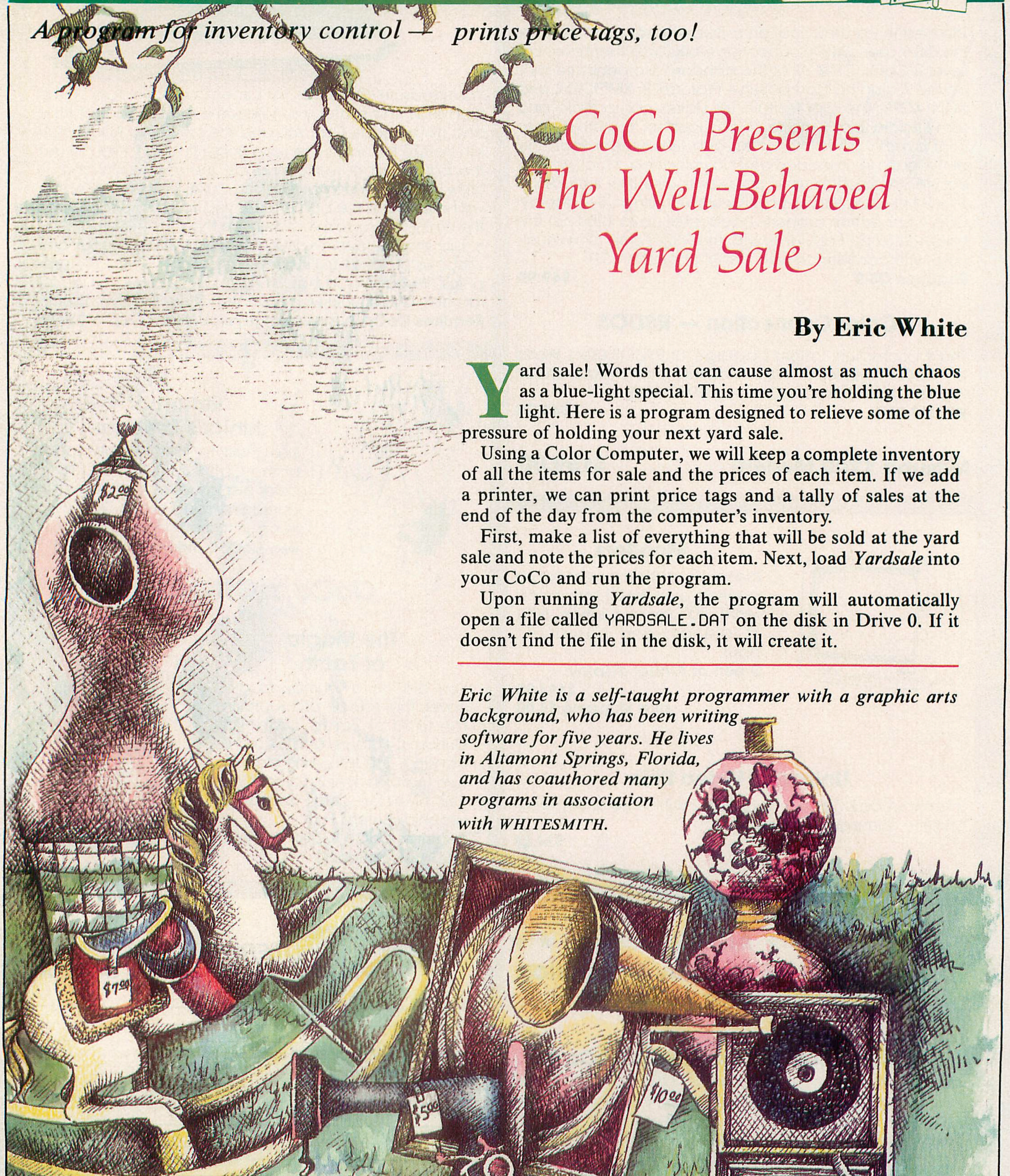
Yard sale! Words that can cause almost as much chaos as a blue-light special. This time you're holding the blue light. Here is a program designed to relieve some of the pressure of holding your next yard sale.

Using a Color Computer, we will keep a complete inventory of all the items for sale and the prices of each item. If we add a printer, we can print price tags and a tally of sales at the end of the day from the computer's inventory.

First, make a list of everything that will be sold at the yard sale and note the prices for each item. Next, load *Yardsale* into your CoCo and run the program.

Upon running *Yardsale*, the program will automatically open a file called `YARDSALE.DAT` on the disk in Drive 0. If it doesn't find the file in the disk, it will create it.

Eric White is a self-taught programmer with a graphic arts background, who has been writing software for five years. He lives in Altamont Springs, Florida, and has coauthored many programs in association with WHITESMITH.

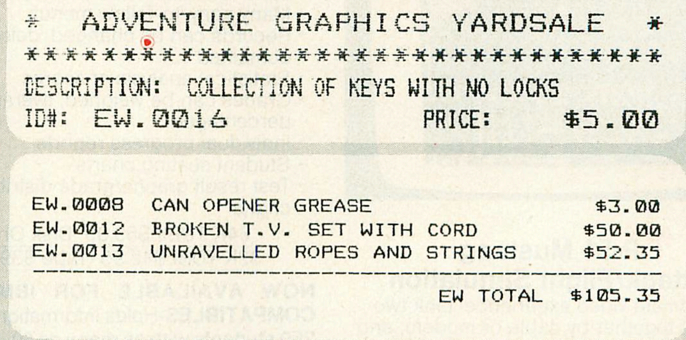


Press I to start data input. You will be asked to input a seller ID code. This is a two-character code that signifies the original owner of each item. Press ENTER to continue. This code is used to make separate totals for each seller, making it easy to combine several yard sales into one big yard sale. The current item number is displayed next to the ID code. Next, enter the description of the item to be sold. This description will appear on the price tag and on the tally sheet. Next comes the price you want to have printed on the price tag ($000.00 to $999.99). Then, type in the lowest price you will sell the item for, and press ENTER. This number is used by the computer/cashier person. If someone offers a bid on an item lower than the price tag, the bid can be checked against this price. The prompt "Any More Items to Enter (Y/N)?" will appear at the bottom of the screen.

Price tags are printed on standard $^{15}/_{16}$-by-3$\frac{1}{2}$ inch computer labels. The printer codes used are in lines 2000 to 2010 and are for normal and compressed print on the DMP-200. To print price tags for the items currently in the computer's inventory, press L (for label). Type in the title of the yard sale (up to 20 characters) and press ENTER. The current print range will be displayed; press N to change the range or Y to print this range.

To sell an item during the yard sale, press F for find. Type in the ID number printed on the lower left-hand corner of the price tag. That item's information will be loaded and displayed. If the item is not sold, you are prompted for "Sell This Item (Y/N)?" Pressing N clears the item's data and returns to standby mode. Press Y to sell the item; type in the price and press ENTER to record the sale. Press CLEAR to abort a sale and return to standby mode. If the item has already been sold, the prompt will read "Re-inventory Item (Y/N)"; pressing Y returns the item to the inventory with a status of not sold. Pressing N returns program to standby mode.

To see how many things have been sold, just press T for tally and S to print on the screen or P to print to the printer. The program will sort the items sold by seller ID codes and print the total for each seller separately.



```
*************************************
*   ADVENTURE GRAPHICS YARDSALE    *
*************************************
DESCRIPTION:  COLLECTION OF KEYS WITH NO LOCKS
ID#:  EW.0016                PRICE:      $5.00
```

```
EW.0008  CAN OPENER GREASE                  $3.00
EW.0012  BROKEN T.V. SET WITH CORD         $50.00
EW.0013  UNRAVELLED ROPES AND STRINGS      $52.35
-------------------------------------------------
                          EW TOTAL        $105.35
```

Sample Printouts

If at any time you want to exit the *Yardsale* program, press CLEAR to abort the current activity, then press E for exit. This will not erase the program, but will close any disk files that were used by the computer before returning to BASIC.

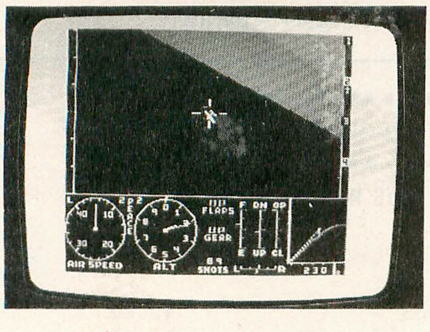
Good luck with your next yard sale, and maybe the next time you hear a crowd of Sunday afternoon shoppers yell "yard sale!" you will be safe behind your CoCo. ☐

The listing: YARDSALE

		1950	174
1240	219	2130	113
1360	199	2230	202
1530	88	2390	72
1650	243	2570	219
1820	49	END	168

```
1000 '***************************
1010 '*   YARDSALE INVENTORY    *
1020 '*  & PRICE TAG PROGRAM    *
1030 '***************************
1040 '* (C) 1987 BY ERIC WHITE *
1050 '*  ALL RIGHTS RESERVED.   *
1060 '* VERSION: 1.00  8701.02 *
1070 '***************************
1080 GOSUB1880'DRAW SCREEN
1090 GOSUB 1970' OPEN FILES
1100 GOSUB1910:GOSUB2030
1110 PRINT@480,WB$;
1120 GOSUB2040
1130 PRINT@480," ";:ON INSTR("IL
FTE",A$) GOTO 1180,2070,1490,243
0,2090
1140 GOTO 1110
1150 '**************************
1160 '        ITEM DATA INPUT
1170 '**************************
1180 A$="INPUT":GOSUB2060:R=LOF(
1)
1190 LSET SF$=MKN$(0)
1200 LSET ST$="I"
1210 PRINT@481,"SELLER ID CODE ?
 "WB$;:C$=""
1220 GOSUB2040:IF A$=CHR$(13) TH
EN 1260
1230 IF A$=CHR$(8) AND LEN(C$) >
 0 THEN C$=LEFT$(C$,LEN(C$)-1):P
RINT@498,C$WB$" ";:SOUND1,1
1240 IF INSTR(RIGHT$(VK$,26),A$)
 AND LEN(C$)<2 THEN C$=C$+A$:PRI
NT@498,C$WB$;:SOUND1,1
1250 GOTO 1220
1260 LSET ID$=C$
1270 R=R+1:PRINT@205,ID$;:PRINTU
```

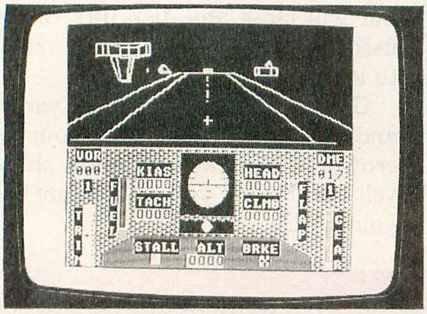
TOM MIX'S MINI-CATALOG



* P-51 Mustang Attack/Flight Simulation

The ultimate video experience! Link two CoCo's together by cable or modem, and compete against your opponent across the table OR across the country! (Both computers require a copy of this program). The P-51 flight simulator lets you fly this WWII attack fighter in actual combat situations—against another player OR against the computer.

32K Machine Language
Flight Manual Included
Tape $29.95 Disk $34.95



* Worlds of Flight Small Plane Simulation

Real-time simulation generates panoramic 3-D views of ground features as you fly your sophisticated plane in any of nine different "worlds." Program models over 35 different aircraft/flight parameters. Realistic sound effects too! Manual included helps you through a typical short flight.

32K Machine Language
Flight Manual Included
Joysticks Required
Tape $29.95 Disk $34.95

Educational Best-Sellers!

*** Teachers Database II**—Allows teachers to keep computerized files of students. Recently updated with many new features!

- Up to 100 students, 24 items per student
- Many easy-to-follow menus
- Records can be changed, deleted, combined
- Statistical analysis of scores
- Grades can be weighed, averaged, percentaged
- Individual progress reports
- Student seating charts
- Test result graphs/grade distribution charts

64K TDBII $59.95 Disk Only
32K TDBI $42.95 Tape $39.95

NOW AVAILABLE FOR IBM PC & COMPATIBLES-Holds information on up to 250 students with as many as 60 individual items of data for each. Contains the features listed above PLUS.

Requires 128K - $89.95

Factpack—Three programs for home or school use provide drill and practice with basic "-/+/÷/x" Grades 1-6.

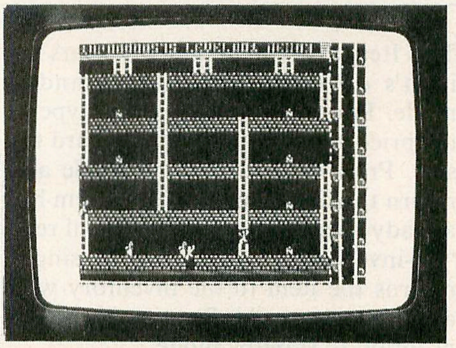
32K Ext. Basic
Tape $24.95 Disk $29.95

Vocabulary Management System—Helps children learn and practice using vocabulary and spelling words. Eleven programs including three printer segments for tests, puzzles, worksheets and five games; many features make this a popular seller!

Requires 16K Ext. Basic/
32K for Printer Output
Tape $39.95 Disk $42.95

Fractions—A Three-Program Package. 1/Mixed & Improper 2/Equivalence 3/Lowest Terms. Practice, review and definitions make learning easy.

32K Ext. Basic
Tape $30.95 Disk $35.95

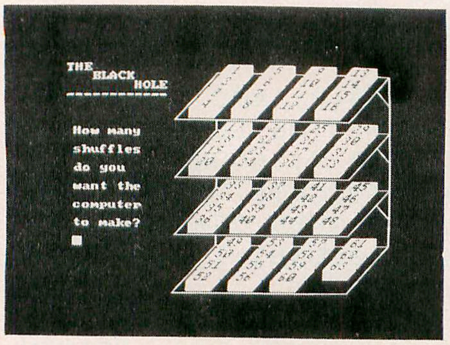


* NEW RELEASE
GOLD FINDER

Here's the quality you have come to expect from TOM MIX. Another outstanding color computer game. This one ranks right up there with "Donkey Kong". Listen to this: 69 levels for one or two players PLUS you can create your own levels (up to 306 on a disk). Endless possibilities await you in this exciting new creation. Move over Goldrunner and Loderunner, here comes GOLD FINDER. . .

32K & Joysticks Required
Disk $27.95

We Have More Software Available Than Listed Here. Please Write for a Free Catalog!



```
THE
  BLACK
    HOLE
----------

How many
shuffles
do you
want the
computer
to make?
```

NEW RELEASE
THE BLACK HOLE

For anyone who enjoys solving a challenging logical puzzle, here is a 3-dimensional puzzle composed of 63 numbered cubes in a 4 by 4 by 4 array that leaves one BLACK HOLE. You tell the computer to sort the cubes and the computer tells you to put them in numerical order. A real brain bender. Outstanding color and action. Years of entertainment. . .

For IBM PC & Compatibles
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Unique Utilities!

New! Use the tools we've used to create "Donkey King," "Sailor Man" and others!

- Full use of 64K RAM
- 100% Machine Language
- No ROM Calls
- Selectable Drive
- Support 1-4 drives
- Menu Selected functions
- "Cold Start" exit to Basic
- Parameters easily changeable in basic loader

MAS Assembler—the finest ever! (Includes EDT)

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EDT—Effortless full screen editing w/2-way cursor. Text files to 48K+. Copy, save, move, delete, print blocks, much more!

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Deputy Inspector—Alphabetize, resort and backup directory; fast 3-swap backups, copy files or programs, auto-reallocate granules during backup for faster loading, more!

Disk $21.95

Sector Inspector—Alphabetize, backup and print directory; repair crashes, LLIST basic programs, read in and edit 23+ grans, much more!

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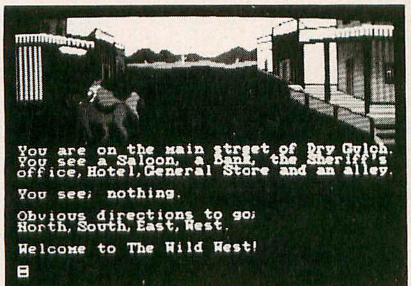
- Add $3.00 postage and handling
- MI residents add 4% sales tax
- Authors—We pay top royalties!

*** CoCo 3 Compatible**

Look What's New at NOVASOFT!

Top-quality software at affordable prices, written by well-known authors in 6809 Machine Language



```
You are on the main street of Dry Gulch.
You see a Saloon, a Bank, the Sheriff's
office,Hotel,General Store and an alley.

You see; nothing.

Obvious directions to go;
North,South,East,West.

Welcome to The Wild West!
```

CoCo 3 Compatible only

NEW RELEASE
THE WILD WEST

Get out your six shooter and polish your spurs! Journey into the gunslinging land of the old west. As sheriff of Dry Gulch, your job is to keep the peace. But the notorious desperado Black Bart has escaped from jail and is on his way to Dry Gulch to recover his hidden fortune!

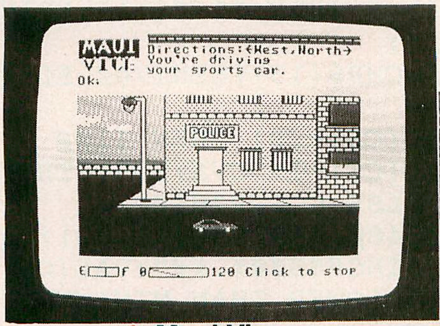
Can you set a trap to capture Black Bart? Or will he get you! You'll have to use every trick in the book, and be quick on the draw as well, as you talk to some unsavory characters. Decide what items you'll need to buy from the General Store, and lay a trap for your enemy!

The Wild West is designed to be played exclusively on the Tandy Color Computer 3.) It has several features not seen in most adventures.

- Incredible animated 320 x 192 16 color hi resolution graphic scenes!
- Four voice music and sound effects.
- Save and load games in progress.
- A vocabulary of over 100 words.
- Automatically SPEAKS with a Tandy Speech Pak.

Requires a 128k Coco³ and one disk drive

Disk $25.95



```
MAUI  Directions:<West,North>
VICE  You're driving
      your sports car.
Ok:

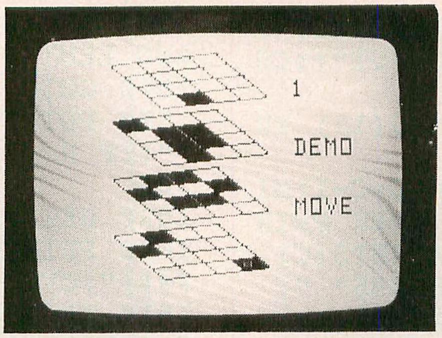
E[  ]F 0[      ]120 Click to stop
```

* Maui Vice

Step into the shoes of Crockett & Tubbs, and gather evidence, photographs and witnesses to convict your suspects! With "windows" to select your options, hi-res graphics, and a new story generated each time you play. This is state-of-the-art that guarantees excitement and newness every time you play.

64K Ext. Basic & Joystick Required

Disk $21.95



* NEW RELEASE
FOURCUBE

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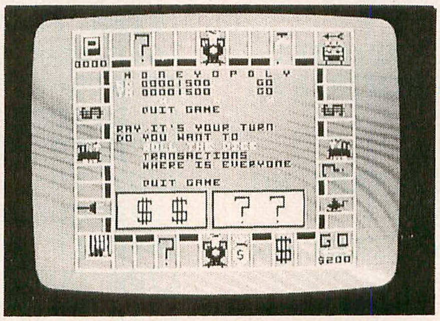

```
MONEYOPOLY
00001500     GO
00001500     GO

QUIT GAME

RAY IT'S YOUR TURN
DO YOU WANT TO

TRANSACTIONS
WHERE IS EVERYONE

QUIT GAME
```

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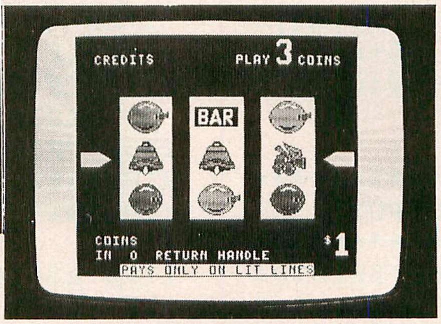

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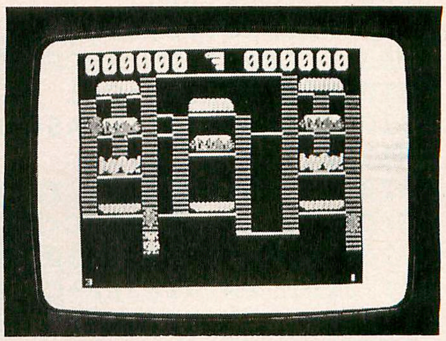

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```
SING".####";R/10000;
1280 LSET IN$=MKN$(R)
1290 GOSUB2030
1300 PRINT@269,WB$;:PRINT@482,"P
RESS [CLEAR] TO ABORT INPUT";:C$
=STRING$(36,32):C=1
1310 GOSUB2040:IF A$=CHR$(13) TH
EN1350
1320 IF A$=CHR$(8) THEN C=C-1:MI
D$(C$,C,1)=" ":IF C<19 THEN PRIN
T@268+C,WB$:PRINT@301,RIGHT$(C$,
18) ELSE PRINT@300+C-18,WB$" ";
1330 IF INSTR((VK$+" !#$%&'()*:-
=@<>?,/"),A$) AND C<37 THEN MID$
(C$,C,1)=A$:C=C+1:PRINT@269,LEFT
$(C$,18):PRINT@301,RIGHT$(C$,18)
:IF C<19 THEN PRINT@268+C,WB$ EL
SE PRINT@300+C-18,WB$;
1340 GOTO 1310
1350 LSET DI$=C$
1360 PRINT@269,LEFT$(C$,18):PRIN
T@301,RIGHT$(C$,18):C$="":C=0
1370 X=364:SP=1000:GOSUB1430:SP=
VAL(C$)/100:LSET SP$=MKN$(SP):PR
INT@372," ";
1380 X=375:C$="":GOSUB1430:LSET
MP$=MKN$(VAL(C$)/100):PRINT@383,
" ";
1390 PUT #1,R
1400 GOSUB2030:PRINT@481,"ANY MO
RE ITEMS TO ENTER (Y/N)";
1410 GOSUB2040:IF A$="Y" THEN GO
SUB1910:GOTO1270
1420 GOTO 1100
1430 PRINT@X,USING"$$###.##";VAL
(C$)/100;:PRINTWB$;:PRINT@373,"m
in";
1440 GOSUB2040:IF A$=CHR$(13) TH
EN RETURN
1450 IF A$=CHR$(8) AND LEN(C$)>0
 THEN C$=LEFT$(C$,LEN(C$)-1):GOT
O1430
1460 IF INSTR(LEFT$(VK$,10),A$)
AND LEN(C$)<5 AND (VAL(C$+A$)/10
0) < SP+.01 THEN C$=C$+A$:GOTO14
30
1470 GOTO 1440
1480 '***************************
1490 '       ITEM DATA OUTPUT
1500 '***************************
1510 A$="FIND":GOSUB2060:PRINT@4
81,"IDEM CODE NUMBER ?"WB$;:C$="
":L$=C$
1520 GOSUB2040
1530 SOUND1,1:IF A$=CHR$(13) THE
N 1580
1540 IF A$=CHR$(8) THEN PRINT@50
0,"        ";:GOTO1510
1550 IF INSTR(VK$,A$) AND LEN(L$
)<7 THEN PRINTCHR$(8)A$WB$;:L$=L
$+A$
1560 IF INSTR(LEFT$(VK$,10),A$)
AND LEN(C$)<4 THEN C$=C$+A$
1570 GOTO 1520
1580 PRINTCHR$(8);:R=VAL(C$):C$=
"":IF R < 1 OR R > LOF(1) THEN 1
100
1590 GET #1,R
1600 PRINT@205,ID$;:PRINTUSING".
####";CVN(IN$)/10000;
1610 IF ST$="I" THEN PRINT"   NO
T SOLD" ELSE PRINTUSING" SOL$$##
#.##";CVN(SF$);:PRINT@213,"SOLD"
;
1620 PRINT@269,LEFT$(DI$,18):PRI
NT@301,RIGHT$(DI$,18)
1630 PRINT@375,USING"$$###.##";C
VN(MP$);:PRINT@373,"min";
1640 PRINT@364,USING"$$###.##";C
VN(SP$);
1650 GOSUB2030:IF ST$="I" THEN 1
670 ELSE PRINT@481,"RE-INVENTORY
 ITEM (Y/N) ?"WB$;
1660 GOSUB2040:IF A$="Y" THEN LS
ET ST$="I":LSET SF$=MKN$(0):PUT
#1,R:GOTO 1590 ELSE GOTO 1100
1670 PRINT@481,"SELL THIS ITEM (
Y/N) ?";
1680 GOSUB2040
1690 IF A$<>"Y" THEN 1100
1700 GOSUB2030
1710 PRINT@481,"SELL FOR HOW MUC
H ?  $"WB$;:C$=""
1720 GOSUB2040
1730 IF A$=CHR$(8) THEN C$="":GO
TO1710
1740 IF INSTR(LEFT$(VK$,11),A$)
AND LEN(C$)<6 THEN C$=C$+A$:PRIN
T@503,C$WB$;
1750 IF A$=CHR$(13)THEN1760 ELSE
 1720
1760 IF VAL(C$)<.01 THEN 1100
1770 IF VAL(C$)+1> CVN(MP$) THEN
 GOTO1830 ELSE GOSUB2030
1780 PRINT@480,STRING$(31,32);:P
RINT@480,USING"$$###.##";VAL(C$)
;:PRINT" IS LOWER THAN MINIMUM."
;
1790 A$=INKEY$:PLAY"V5;T200ABCD"
:IF A$="" THEN 1780
1800 GOSUB2030:PRINT@481,"SELL A
T ";:PRINTUSING"$$###.##";VAL(C$
);:PRINT" ANYWAY (Y/N)?";
1810 GOSUB2040
1820 IF A$="Y" THEN 1830 ELSE 17
00
```

```
1830 LSET SF$=MKN$(VAL(C$)):LSET
 ST$="S":PUT #1,R
1840 GOTO1100
1850 '***************************
1860 '        DRAW SCREEN
1870 '***************************
1880 CLS0
1890 FORX=1TO96:PRINT@X-1,CHR$(A
SC(MID$("J;J;<J=;JGF;HIH=;RWW;LZ
M;Z;;;ZWWH>J;J;J;J>I;@E;J;OWV;Z;
Z;Z;;;ZWW>>I;JGJ;J;J;BFBC;XNY;ZW
Z;ZNN;ZNN",X))+117);:NEXT
1900 FOR X=128 TO 479:POKE1024+X
,32:NEXTX:RETURN
1910 PRINT@192,"item";:PRINT@197
,"number":POKE1227,58
1920 PRINT@256,"discription":POK
E1291,58
1930 PRINT@300," "
1940 PRINT@353,"price";:PRINT@35
9,"list           min":POKE1387,5
8
1950 PRINT@416,"Input";:PRINT@42
3,"Labels";:PRINT@431,"Find";:PR
INT@437,"Tally";:PRINT@444,"Exit
";
1960 RETURN
1970 OPEN "D",#1,"YARDSALE/DAT",
59
1980 FIELD #1,2 AS ID$,5 AS IN$,
36 AS DI$,5 AS SP$,5 AS MP$,1 AS
 ST$,5 AS SF$
1990 VK$="0123456789.ABCDEFGHIJK
LMNOPQRSTUVWXYZ":WB$=CHR$(207)
2000 NM$=CHR$(27)+CHR$(19)'NORMA
L PRINT
2010 CP$=CHR$(27)+CHR$(20)'COMPR
ESSED PRINT
2020 RETURN
2030 PRINT@128,"  COPYRIGHT 1987
 BY ERIC WHITE":FORX=1535 TO 150
4 STEP-1:POKEX,207:PLAY"P200":PO
KEX,96:NEXTX:RETURN
2040 A$=INKEY$:IF A$=""THEN2040
2050 IF A$=CHR$(12) THEN 1100 EL
SE RETURN
2060 PRINT@128,"":B$=A$:X=INT(32
/(LEN(A$)+2)):FORY=2 TO X:B$=B$+
"  "+A$:NEXTY:PRINT@128+(32-LEN(
B$))/2,B$:RETURN
2070 GOTO2110
2080 PRINT@481,"TALLY";:GOTO 112
0
2090 CLOSE #1:CLS:END
2100 '***************************
2110 '   PRINT PRICES LABELS
2120 '***************************
2130 A$="LABELS":GOSUB2060:PRINT
@481,"TITLE ?  "WB$;:C$=""
2140 GOSUB 2040:IF A$=CHR$(13) T
HEN T$="*"+STRING$(31,32)+"*":MI
D$(T$,18-(LEN(C$)+9)/2,LEN(C$)+9
)=C$+" YARDSALE":C=1:C$=RIGHT$(S
TR$(LOF(1)),LEN(STR$(LOF(1)))-1)
:PRINTCHR$(8);:GOTO2180
2150 IF A$=CHR$(8) AND LEN(C$)>0
THEN C$=LEFT$(C$,LEN(C$)-1):PRIN
T@490,C$WB$" ";
2160 IF INSTR((VK$+" !#$%&'()*:-
=@<>?,/"),A$) AND LEN(C$)<20 THE
N C$=C$+A$:PRINT@490,C$WB$;
2170 GOTO 2140
2180 GOSUB2030:PRINT@481,"PRINT
RANGE"C"- "C$" (Y/N)";
2190 GOSUB2040:IF A$="Y" THEN 23
00
2200 GOSUB2030:PRINT@481,"ENTER
RANGE,FROM: "WB$"   TO:";:C$=""
2210 GOSUB 2040:IF A$=CHR$(13) A
ND VAL(C$)>0 AND VAL(C$)<(LOF(1)
+1) THEN 2250
2220 IF A$=CHR$(8) AND LEN(C$)>0
THEN C$=LEFT$(C$,LEN(C$)-1):PRIN
T@499,C$WB$" ";
```

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```
2230 IF INSTR(LEFT$(VK$,10),A$)
AND LEN(C$)<3 THEN C$=C$+A$:PRIN
T@499,C$WB$;
2240 GOTO 2210
2250 PRINT@499+LEN(C$)," ";:PRIN
T@507,WB$;:C=VAL(C$):C$=""
2260 GOSUB2040:IF A$=CHR$(13) AN
D VAL(C$)+1>C AND VAL(C$)<LOF(1)
+1 THEN 2180
2270 IF A$=CHR$(8) AND LEN(C$)>0
 THEN C$=LEFT$(C$,LEN(C$)-1):PRI
NT@507,C$WB$" ";
2280 IF INSTR(LEFT$(VK$,10),A$)
AND LEN(C$)<3 THEN C$=C$+A$:PRIN
T@507,C$WB$;
2290 GOTO 2260
2300 GOSUB2030:PRINT@481,"IS THE
 PRINTER READY ? (Y/N)";:GOSUB20
40
2310 IF A$<>"Y" THEN 1100
2320 FOR X=C TO VAL(C$)
2330 PRINT#-2,STRING$(33,"*")
2340 PRINT#-2,T$
2350 PRINT#-2,STRING$(33,"*")
2360 GET #1,X
2370 PRINT#-2,CP$"DESCRIPTION:
"DI$
2380 PRINT#-2,"ID#:  "NM$ID$;:PR
INT#-2,USING".####";X/10000;:PRI
NT#-2,"          "CP$"PRICE: "NM
$;:PRINT#-2,USING"$$###.##";CVN(
SP$)
2390 PRINT#-2,NM$:NEXTX:GOTO1100
2400 '***************************
2410 '        PRINT TALLY
2420 '***************************
2430 A$="TALLY":GOSUB2060:PRINT@
481,"TALLY TO SCREEN/PRINTER (S/
P)?";
2440 GOSUB 2040:IF A$=CHR$(13) T
HEN 1100
2450 IF A$="S" THEN DV=0:GOTO248
0
2460 IF A$="P" THEN DV=2:GOTO248
0
2470 GOTO 2440
2480 FORX=1 TO LOF(1)
2490 GET #1,X:A=0
2500 IF I$(A)=ID$ THEN 2540
2510 IF I$(A)="" THEN I$(A)=ID$:
GOTO2540
2520 IF A>9 THEN 2540
2530 A=A+1:GOTO 2500
2540 NEXTX:IF DV=0 THEN CLS
2550 FORY=0 TO A:TL=0:FORX=1 TO
LOF(1)
2560 GET #1,X:IF ID$=I$(Y) AND S
T$="S" THEN 2620
2570 NEXTX:IF TL THEN PRINT#-DV,
STRING$(53,"-"):PRINT#-DV,STRING
$(36,32)I$(Y)" TOTAL";:PRINT#-DV
,USING"$$####.##";TL:PRINT#-DV:P
RINT#-DV
2580 IF DV=0 AND TL>0 THEN GOSUB
2040:CLS
2590 NEXTY
2600 IF DV=0 THEN GOSUB1880
2610 GOTO1100
2620 PRINT#-DV,I$(Y);:PRINT#-DV,
USING".####";X/10000;
2630 PRINT#-DV,"  "DI$;:PRINT#-D
V,USING"$$###.##";CVN(SF$)
2640 TL=TL+CVN(SF$):GOTO2570
2650 '***************************
2660 '*   YARDSALE INVENTORY    *
2670 '*  &  PRICE TAG PROGRAM   *
2680 '***************************
2690 '* (C) 1987 BY ERIC WHITE *
2700 '*   ALL RIGHTS RESERVED.  *
2710 '* VERSION: 1.00   8701.02 *
2720 '***************************
```

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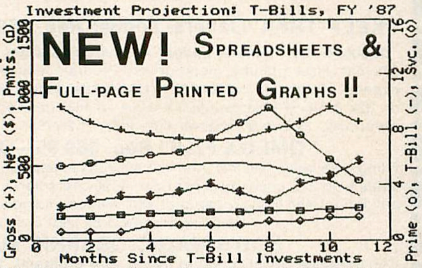

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16K ECB

Better guess fast because the fuse is lit

Explosive Word Fun

By Kent Baumgardt

Word Guess is a game in which you have a limited number of tries to guess a hidden word before the dynamite explodes. Load the program and run it. You will see an orange color screen while the computer is setting up the variables. You are then asked to enter a level (1-3) and the number of words (10-80) you want to guess. The game now starts.

On the left side of the screen is the dynamite with a long fuse. Under the Words Left indicator, you see several boxes in a row. This indicates the length of the word you are to guess. Begin by pressing any letter key (try vowels to start).

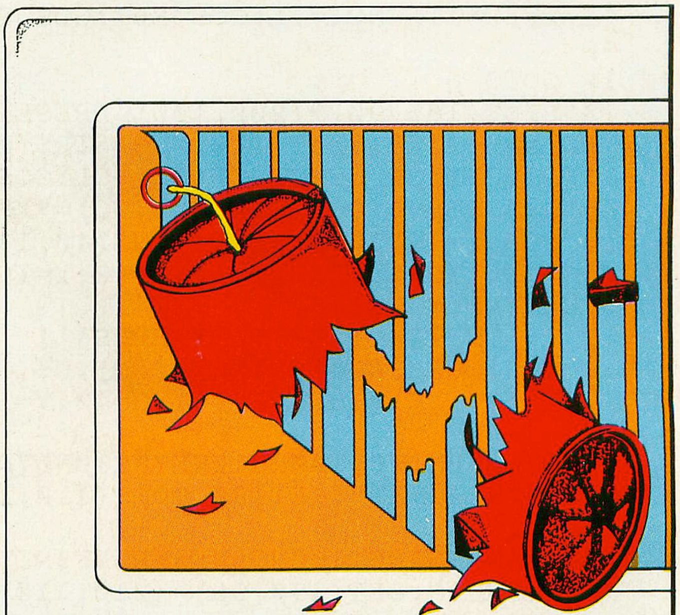
If your guess is correct, it appears on one of the bottom lines (this helps you remember your guess) and in one of the boxes. Your score is updated too.

If you make an incorrect guess, you will hear a sound, your letter appears only on the bottom line and the fuse burns. If you run out of tries, the screen flashes. You will see the level you played on, your score and the word you didn't complete. Then you are given the option to end or play again. You can press CLEAR during the game to end. Here is a listing of variables and what they do in the program:

Variable	**Description**
WD$ (1-80)	Words to guess
N$ (0-9)	Number drawing data
AL$ (1-26)	Alphabet drawing data
I$	Input through INKEY$
LL$	Letters to be drawn
NN$	Numbers to be drawn
W$	Single character in current word (compared with your input)
V1, V2	Large, small fuse burn
H, V	Coordinates for drawing guessed letters
ACU	Accumulator
LN	Length of current word
GT	Game total score
SC	Word score
x, y	Coordinates for drawing

If you have questions or comments you can call me at (513) 252-4848 anytime from 2 p.m. to 6 p.m. EST or write to me at 3522 East Fifth St., Dayton, OH 45403. ☐

Kent Baumgardt is 16 years old and lives in Dayton, Ohio. He began working with computers when a 64K ECB CoCo was purchased for the family in January of 1984. In addition to ECB programming and graphics, he is interested in machine language.



14	189
24	208
40	77
49	27
70	232
85	71
104	64
118	73
END	214

The listing: WORDGUES

```
0 PCLEAR4:CLEAR200:DM=80
1 PMODE4,1:PCLS:GOSUB15:PCLS:SCR
EEN1,1:GOSUB31:PCLS:GOSUB105:PCL
S:GOSUB20
2 FORX=1TODM:READWD$(X):NEXT
3 '''''''MAIN PROGRAM'''''''''
4 FORNM=1TOD:CIRCLE(15,140),10,,
.5:WD=RND(DM):ACU=0:LINE(15,10)-
(15,140),PSET:MV=0:LN=LEN(WD$(WD
)):WD$=WD$(WD):IFWD$(WD)="X"THEN
3
5 FORXX=1TOLN:LINE((XX*10)+100,1
30)-((XX*10)+110,140),PSET,B:NEX
T
6 GOSUB38:IFACU=LN THEN13
7 IFI$=CHR$(12)THENCLS:PRINT@39,
"YOUR SCORE IS:"GT+SC:PRINT@232,
"HAVE A GOOD DAY!!":END
8 IFI$>"@"ORI$<"^"GOSUB87
9 FORG=1TOLN:W$=MID$(WD$(WD),G,1
):IFI$<>W$THENNEXTG
10 IFI$=W$THENMID$(WD$(WD),G,1)=
CHR$(255):CI=CL:X=G*10+103:Y=138
:LL$=I$:BP=0:GOSUB58:GOSUB90:NEX
TG:GOTO6
11 IFBP=1THENCI=IL:GOSUB67:GOSUB
90
12 GOTO 6
13 LINE(165,90)-(200,100),PRESET
,BF:M=M-1:X=170:Y=100:NN$=STR$(M
):GOSUB51:GT=GT+SC+CW:SC=-CL:GOS
UB90:GOSUB93:GOSUB95:WD$(WD)="X"
14 FORPP=1TO1000:NEXT:LINE(40,13
0)-(255,169),PRESET,BF:H=42:Y=16
9:NEXTNM:GOTO115
15 '''INITIALIZE  VARIABLES'''
16 CLS:SCREEN0,1:DIMWD$(DM),N$(9
),AL$(27),V1(18),V2(18):H=42:V=1
69
17 DRAW"BM100,100NU10NE7NR10NF7N
D10NG7NL10NH7":GET(90,90)-(110,1
10),V1,G
18 DRAW"BM200,100NU5NE3NR5NF3ND5
NG3NL5NH3":GET(190,90)-(210,110)
,V2,G
19 FORX=1TO27:READAL$(X):NEXT:FO
RX=0TO9:READN$(X):NEXT:RETURN
20 '''''''''DRAW TITLE''''''''
21 X=54:Y=15:S=10:SP=14:LL$=" W
O R D   G U E S S":GOSUB58
22 LINE(42,5)-(205,20),PSET,B:CI
RCLE(15,140),10,,.5:CIRCLE(15,18
0),10,,.5,0,.5:LINE(5,140)-(5,18
0),PSET:LINE(25,140)-(25,180),PS
ET:LINE(15,10)-(15,140),PSET
23 FOR X=40 TO 240 STEP 10:LINE(
X,170)-(X+7,170),PSET:NEXT
24 X=35:Y=60:LL$="GAME TOTAL":GO
SUB58:GOSUB93
25 X=160:Y=60:LL$="THIS WORD":GO
SUB58
26 CI=0:GOSUB90
27 X=100:Y=40:LL$="LEVEL ":GOSUB
58
28 X=145:Y=40:NN$=STR$(LV):GOSUB
51
29 X=80:Y=185:LL$="PRESS CLEAR T
O END":GOSUB58
30 X=90:Y=100:LL$="WORDS LEFT":G
OSUB58:X=170:NN$=STR$(M):GOSUB51
:RETURN
31 '''''''LEVEL INPUT'''''''''
32 X=90:Y=70:LL$="SELECT LEVEL":
GOSUB58:X=100:Y=105:NN$="1":GOSU
B51:X=125:Y=105:NN$="2":GOSUB51:
X=150:Y=105:NN$="3":GOSUB51
33 GOSUB38:IFI$<"1"ORI$>"3"THEN3
3ELSELV=VAL(I$)
34 IFLV=1THENX1=98:Y1=106:X2=106
:Y2=98:INC=8.5:CL=20:IL=-2:CW=10
35 IFLV=2THENX1=123:Y1=106:X2=13
1:Y2=98:INC=13:CL=30:IL=-4:CW=15
36 IFLV=3THENX1=148:Y1=106:X2=15
6:Y2=98:INC=26:CL=40:IL=-6:CW=20
37 FORZ=1TO10:LINE(X1,Y1)-(X2,Y2
),PSET,B:FORPP=1TO50:NEXT:LINE(X
1,Y1)-(X2,Y2),PRESET,B:FORPP=1TO
50:NEXT:NEXT:RETURN
38 ''''''''''INKEY$''''''''''
39 SOUND 200,2
40 I$=INKEY$:IFACU=LN THEN41ELSE
IFI$=""THEN40
41 RETURN
42 ''LETTER AND NUMBER DATA''
43 DATA BU1U4E1R2F1NG4D4G1L2H1BD
1
44 DATAU5E1R2F1D2NL4D3BL4,U6R3F1
D1G1NL3F1D1G1L3,BU1U4E1R2F1BD4G1
L2H1BD1,U6R2F2D2G2L2,U6R4BD3BL1L
3D3NR4
45 DATA U6R4BD3BL1L3D3,BU1U4E1R3
BD4NL1D2L3H1BD1,U6BR4D3NL4D3BL4,
BU6BR1R2L1D6NR1L1BL1,BU6BR4D5G1L
2H1BD1,U6D3R1NE3NF3BD3BL1
46 DATA NU6NR4,U6F2ND1E2D6BL4,U6
D1F4NU5D1BL4,BU1U4E1R2F1D4G1L2H1
```

Telewriter-64™

the Color Computer Word Processor

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- **Right justification**
- **Easy hyphenation**
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- **Embedded format and control codes**
- **Runs in 16K, 32K, or 64K**
- **Menu-driven disk and cassette I/O**
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THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

...one of the best programs for the Color Computer I have seen...
— Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

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File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

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— The RAINBOW, Jan. 1982

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```
BD1,U6R3F1D1G1L3D3,BU1U4E1R2F1D3
G1NH1NF1G1L1H1BD1
47 DATA U6R3F1D1G1L3R1F3BL4,BU5B
R4H1L2G1D1F1R2F1D1G1L2H1BD1,BU6R
4L2D6BL2,BU1U5BR4D5G1L2H1BD1,BU6
BR4D2G1D1G1ND1H1U1H1NU2BD4,NU6E2
NU1F2NU6BL4
48 DATA BU6D1F2E2NU1BD4ND1H2G2D1
,BU6BR4D1G2ND3H2NU1BD5,BU6R4D1G4
D1NR4
49 DATA BU1U4E1R2F1NG4D4G1L2H1BD
1,BU6BR2NG1D6R1L2BL1,BU5E1R2F1D1
G1L1G2D1NR4,BU5E1R2F1D1G1NL1F1D1
G1L2H1BD1,BU2NR4U1E3D6BL3
50 DATA BU6NR4D3E1R2F1D2G1L2H1BD
1,BU6BR2NR2G2D3U2R3F1D1G1L2H1BD1
,BU6R4D1G3D2BL1,BU1U1E1NR1H1U1E1
R2F1D1G1NL1F1D1G1L2H1BD1,BU4NF1U
1E1R2F1D2NL3D1G2L2
51 '''''DRAWING NUMBERS''''''
52 FORNN=1TOLEN(NN$)
53 N1$=MID$(NN$,NN,1)
54 N=ASC(N1$)-48
55 IFN<0THEN57
56 DRAW"BM=X;,=Y;XN$(N);"
57 X=X+7:NEXT:RETURN
58 ''''DRAWING LETTERS''''''
59 IFBP=1THENSOUND1,2
60 IFBP=0THENACU=ACU+1:SOUND100,
2
61 FORLL=1TOLEN(LL$)
62 L1$=MID$(LL$,LL,1)
63 L=ASC(L1$)-63
64 IFL<0THEN66
65 DRAW"BM=X;,=Y;XAL$(L);"
66 X=X+7:NEXT:C=0:RETURN
67 ''''''''FUSE BURN''''''''
68 FORBR=1TO10:PUT(5,MV)-(25,MV+
20),V1,PSET:PUT(5,MV)-(25,MV+20)
,V2,PSET:NEXTBR
69 MV=MV+INC:IFMV>119THEN70ELSEL
INE(0,0)-(25,MV+20),PRESET,BF:RE
TURN
70 '''''''''EXPLOSION'''''''
71 FORX=1TO20:PLAY"L255T255O1V31
CGEF":NEXT
72 FORX=1TO10:IFC=1THENC=0ELSEC=
1
73 PLAYSTR$(RND(12)):PCLSC:SCREE
N1,C:NEXTX
74 SCREEN1,1:PCLS1:DRAW"C0":GT=G
T+SC
75 X=90:Y=30:LL$="YOU  BLEW  IT"
:GOSUB58
76 X=130:Y=50:LL$="ON":GOSUB58
77 X=90:Y=70:LL$="LEVEL":GOSUB58
78 X=170:Y=70:NN$=STR$(LV):GOSUB
51
79 X=90:Y=80:LL$="SCORE":GOSUB58
:X=170:NN$=STR$(GT):GOSUB51:IFGT
<0THENDRAW"BM164,77R5"
80 X=40:Y=120:LL$="THE WORD WAS
":GOSUB58
81 LINE(130,112)-(LN*10+123,123)
,PRESET,BF
82 X=132:Y=120:DRAW"C1":IFLN>4TH
ENLL$=" "+WD$:GOSUB58ELSELL$=WD$
:GOSUB58
83 X=60:Y=150:DRAW"C0":LL$="PRES
S ENTER TO REPLAY":GOSUB58
84 X=60:Y=160:LL$="PRESS CLEAR T
O STOP":GOSUB58
85 GOSUB 38
86 IFI$=CHR$(12)THENCLS:PRINT@23
2,"HAVE A NICE DAY!!":ENDELSEIFI
$=CHR$(13)THENRUNELSE85
87 ''''''''GUESSES''''''''''
88 X=H:Y=V:IFI$<>""THENLL$=I$
89 BP=1:GOSUB58:H=H+10:RETURN
90 ''''''''WORD SCORES''''''''
91 LINE(150,76)-(220,66),PRESET,
BF:SC=SC+CI:X=180:Y=75:NN$=STR$(
SC):GOSUB51:IFSC<0THENDRAW"BM178
,72R5"
92 RETURN
93 ''''''''GAME TOTAL'''''''''
94 LINE(50,75)-(100,65),PRESET,B
F:X=60:Y=75:NN$=STR$(GT):GOSUB51
:RETURN
95 ''''''''''REWARD''''''''''
96 FORPP=1TO5
97 AA=(LN*10)+115
98 LINE(105,125)-(AA,145),PSET,B
:SOUND10,1
99 LINE(100,120)-(AA+5,150),PSET
,B:SOUND30,1
100 LINE(95,115)-(AA+10,155),PSE
T,B:SOUND50,1
101 LINE(105,125)-(AA,145),PRESE
T,B:SOUND10,1
102 LINE(100,120)-(AA+5,150),PRE
SET,B:SOUND30,1
103 LINE(95,115)-(AA+10,155),PRE
SET,B:SOUND50,1
104 NEXT:RETURN
105 ''''''NUMBER OF WORDS''''''
106 X=30:Y=30:LL$="PLEASE ENTER
NUMBER OF WORDS":GOSUB58
107 FORPP=1TODM/10:READX,Y,LL$,N
N$
108 IFLEN(NN$)<3THENNN$="       "
+NN$ELSENN$="      "+NN$
109 GOSUB58:GOSUB51:NEXT
110 GOSUB38:IFI$<"A"ORI$>"L"THEN
110
111 D=(ASC(I$)-64)*10:IFD>DM THE
ND=DM
112 DRAW"S6":FORPP=1TO5:X=200:Y=
100:LL$=I$:SOUND150,1:GOSUB58:FO
RP=1TO50:NEXT:LINE(195,105)-(210
,90),PRESET,BF:FORP=1TO50:NEXT:N
EXT:DRAW"S4"
113 M=D:RETURN
114 DATA60,50,A,10,60,60,B,20,60
,70,C,30,60,80,D,40,60,90,E,50,6
0,100,F,60,60,110,G,70,60,120,H,
80
115 ''''''''ENDING'''''''''
116 DRAW"C1"
117 PCLS:X=30:Y=40:LL$="I DONT H
AVE ANY MORE WORDS":GOSUB58
118 X=65:Y=50:LL$="FOR YOU TO GU
ESS":GOSUB58
119 X=70:Y=70:LL$="LEVEL":GOSUB5
8
120 X=120:Y=70:NN$=STR$(LV):GOSU
B51
121 X=70:Y=80:LL$="SCORE":GOSUB5
8
122 X=120:Y=80:NN$=STR$(GT):GOSU
B51
123 X=40:Y=100:LL$="PRESS E TO E
ND":GOSUB58
124 X=40:Y=110:LL$="PRESS R TO R
EPLAY":GOSUB58
125 GOSUB38:IFI$="E"THENCLS:PRIN
T@232,"HAVE A GOOD DAY!!"ELSEIFI
$="R"THENRUNELSE125
126 '''''''''WORD DATA''''''''''
127 DATA DIVISION,HELLO,SIMPLE,L
AST,GENESIS,TAPE,HOUSE,GENTLE,QU
IET,HAPPY
128 DATA SUBTLE,LIZARD,FLOWER,MA
N,CHILD,WOMAN,BOY,GIRL,GOODNESS,
THRIFTY
129 DATA ACHE,BACKGROUND,CABBAGE
,DAIRY,EAGER,FACT,GAIN,ICY,KEEN,
LACK
130 DATA MACHINE,OBJECT,PACE,QUA
RT,RANGE,SABBATH,TABLET,UGLY,VAI
N,WAGES
131 DATA YIELD,ZERO,ABILITY,BAGG
AGE,CALENDAR,DAILY,EARNEST,FACTO
R,GARAGE,HANDSOME
132 DATA IDEAL,JANITOR,KEROSENE,
MACHINERY,NAMELY,OBSERVATION,PAJ
AMAS,QUALIFIED,RADAR,SALESMAN
133 DATA TABERNACLE,UNBELIEVER,V
ACANT,WANDER,YOURSELVES,ZEBRA,AB
OARD,BACHELOR,CABINET,DAMNATION
134 DATA EDUCATIONAL,FACULTY,GEN
IUS,HARASS,IDENTIFY,JEWELRY,KIDN
APPED,LEGAL,MAINTENANCE,NATURALL
Y
```

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Disabling the CoCo 3 Color Burst Signal

By Robert Gault, Ph.D

The color burst is the part of a television signal that tells the receiver the signal is in color. If the color burst is missing, the TV or monitor will turn off its color circuits.

If a composite monitor is used with the high resolution text screens, particularly the 80-character screen, there is considerable color artifacting of the letters. If a monochrome monitor is used, the color information leaves distortion on the screen. It is desirable in both cases to be able to turn off the color output of the CoCo 3.

The color burst can be controlled with Bit 4 (0-7) of byte $FF98. When this bit is clear, the color burst is on. When the bit is set, the color burst is off. What is needed is a way to keep this bit set as required. CoCo has not made this easy for us. Each time a pass is made through the idle loop at command level, Bit 4 of $FF98 is cleared. The offending code starts at $E019. First a test is made of which text screen is in use: 32-, 40- or 80- character. Then, three tables are used to obtain values to store into the GIME chip. The values stored into $FF98 are located at $E033, $E03C and $E045. The following line of code results in the color burst being turned off in all three text screens. It must be reused each time you push the reset button:

```
POKE &HE033,16:POKE &HE03C,19:
POKE &HE045,19
```

To obtain the best contrast, you should use black and white for the foreground/background, not colors. This can be adjusted with the `PALETTE` command. Even with the color burst off, there is enough high frequency information in the signal to confuse the monitor if the `PALETTE` colors are not set to black and white.

For the 32-character screen, use:

```
PALETTE12,0:PALETTE13,63:CLS
```

or

```
PALETTE12,63:PALETTE13,0:CLS.
```

For the 40- or 80-character screen, use:

```
PALETTE0,0:PALETTE8,63:CLS1
```

or

```
PALETTE0,63:PALETTE8,0CLS5.
```

(You may direct questions about this article to Dr. Gault at 832 N. Renaud, Grosse Pointe Woods, MI 48236, 313-881-0335. Please enclose an SASE for a reply when writing.)

Robert Gault holds a doctorate in chemistry and works as a forensic toxicologist. He has owned his Color Computer since 1983, and has published several Color Computer articles.

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Assorted Shorties

Graphics

CoCo 3

Graphics Trio

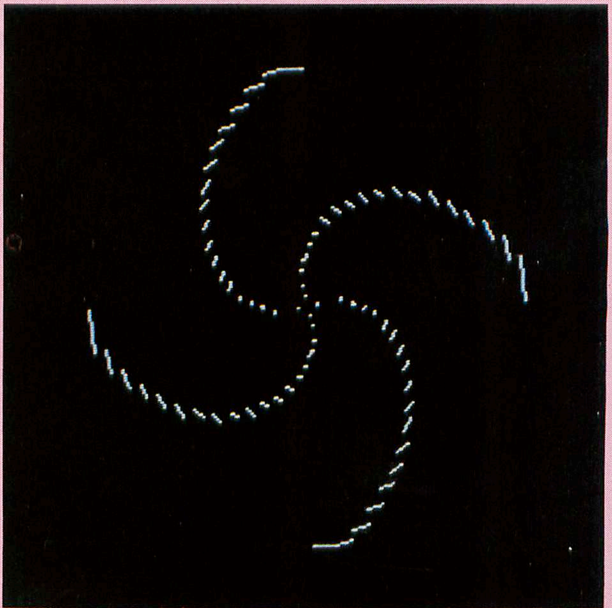
By Randy Cassel

I thought nothing would make me give up my old CoCo, but the CoCo 3 is amazing. The new commands are fantastic, and I've written three programs that show off the ways the `PALETTE` command can be used for animation.

Spinner is an animated rotating pinwheel. Try changing the fraction 1/60 to 1/45, 1/30 or 1/15. Remember to make the changes in all lines where it appears, lines 60, 70 and 100. Also, try changing the H/W ration in the `HCIRCLE` command in Line 70.

The second program, *Circles*, is a random circle generator. Experiment here by changing `HCIRCLE` to `HLINE-(A,B),PSET,BF` and insert Line 65, `HCOLOR RND(C)0` and delete Line 80. Also try `HSET (ABC)` and delete Line 80.

The final program, *IPopper*, uses the 32-column screen. I think it has possibilities in Adventure games.



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The third generation CoCo Word Processor is here! All the powerful features, advantages and benefits of EliteWord plus 40/80 column display formats for the CoCo III. Available only from Spectrum Projects! $79.95 Special word processing package of EliteWord and EliteSpel for $99.95 (see Rainbow Review March '87)

• FKEYS III – Function Keys for COCO III

A productivity enhancement that gives you the capability to add twenty (20) pre-defined functions to the CoCo III by using the CTL, F1 and F2 keys! $24.95 (see April '87 Rainbow Review)

• 512K UPGRADE (NOW $99.95*)

Easy installation with a superior design for a reliable upgrade, processing efficiency and AVAILABLE NOW for the CoCo III! $99.95* A 512K upgrade without RAM chips $49.95* (see March '87 Rainbow Review)
*-The lowest upgrade prices in the Rainbow magazine, period!!!

• RGB PATCH – No more BLACK & WHITE dots ...

Did you buy an expensive RGB monitor (CM-8) just so that you could see your Hi-Res artifacting CoCo 2 games in BLACK & WHITE ??? RGB PATCH converts most games to display in COLOR on an RGB monitor. 128K DISK $24.95

• VIDEO DIGITIZER III – 25 Frames/sec

Take pictures with speed! The fastest CoCo Video Digitizer ever! Twenty-five (25) frames a second (3 Xs faster than the DS-69A!) Now available for the CoCo III. $149.95 Req. 128K CoCo III with a 40 pin 'Y' cable or Y-Box.

• RGB MONITOR – Better than CM-8!

Our monitor is much more versatile than the Tandy CM-8! Takes a variety of video inputs, including: RGB Analog, Color Composite and RGB TTL. Unlike the CM-8, PMODE 4 artifact colors don't show up BLACK and WHITE (when processed through the Color Composite input) $299.95

• PAL SWITCHER – Designed by Marty Goodman!

Have the best of both worlds by being able to switch between CoCo II and CoCo III modes when using a Multi-Pak Interface. Req. OLDER PAL & NEW PAL chip for the 26-3024 Multi-Pak Interface $29.95/with NEW PAL chip $39.95

Guide to CoCo III Graphics $19.95	CoCo III Unraveled !!!! $29.95
CoCo III Multipak PAL chip $19.95	CoCo III Service Manual $39.95
CoCo III Monochrome driver $39.95	512K CoCo III Computer $299.95

All orders plus $3.00 S/H (Foreign $5.00) – COD add $2.00 extra – NYS Residents add Sales Tax

SPECTRUM PROJECTS
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COCO HOT LINE 718-835-1344

Listing 1: SPINNER

```
 10 ON BRK GOTO 140
 20 C=1
 30 POKE65497,0
 40 PALETTE 0,0:HSCREEN2
 50 FOR X=1 TO 15:PALETTE X,RND(6
 3):NEXT
 60 FOR X=1 TO 0 STEP -1/60
 70 HCIRCLE(160,96),R,C,1,X+S,E+X
 +1/60
 80 C=C+1:IFC>15 THEN C=1
 90 NEXT X
 100 S=S+1/60:E=E+1/60:C=1:R=R+5:
 IFR>95 THEN 120
 110 GOTO 50
 120 FOR X=1 TO15:PALETTE X,63:PA
 LETTE X,0:NEXT X
 130 GOTO 120
 140 PALETTE CMP:POKE 65496,0
```

Listing 2: CIRCLES

```
10 ON BRK GOTO 110
20 POKE65497,0
30 PALETTE 0,0:HSCREEN2
40 FOR X=1 TO 15:PALETTE X,RND(6
3):NEXT X
50 FOR X=1 TO 75
60 A=RND(320)-1:B=RND(192)-1:C=R
ND(15)
70 HCIRCLE(A,B),RND(25),C
80 HPAINT(A,B),RND(15),C
90 NEXT X
100 PALETTE RND(15),RND(63):GOTO
 100
110 POKE 65496,0:PALETTE CMP
```

Listing 3: IPOPPER

```
10 WIDTH 32
20 ON BRK GOTO 150
30 CLS
40 PRINT"TYPE SOMETHING (32 LETT
ER LIMIT)"
50 LINEINPUTA$
60 IF LEN(A$)>32 THEN 30
70 A=INT((32-LEN(A$))/2)
80 PALETTE 13,0
90 CLS
100 PRINT@224:PRINTTAB(A)A$
110 FOR X=1 TO 63
120 PALETTE 12,X
130 NEXT X
140 GOTO 110
150 PALETTE CMP
```

Home Help

Grocery

4K

By Donald Large

Several years ago I started helping my wife with chores around the house. I learned the "right" way to vacuum the carpets, wash the dishes and do the laundry. About the only weekly chore I couldn't get right was grocery shopping. In spite of the various notes that were pinned to my jacket, I still managed to forget something, get the wrong brand, or neglect to use the proper coupon.

I looked for a program to make grocery lists, but couldn't find one, so I decided to write my own. I started by taking a tour through the grocery store where we normally shop, and took note of where different items were located. I then designed a printout sheet to follow this path (except where item groupings didn't follow the layout of the store). I then added a spot to indicate coupons I might have, and a place for any special instructions.

This short program will produce 10 shopping lists. Each time you get ready to do your grocery shopping, fill it out. It will help you get everything you need, remind you to use your coupons, and specify the correct brands you need to look for.

Portion of Sample Printout

```
SHOPPING LIST

            ITEM             COUPON           BRAND
   ****************************************************************


        ---  FRESH VEG.      ---             ---------------
        ---  CANNED VEG.     ---             ---------------
        ---  CEREAL          ---             ---------------
        ---  RICE            ---             ---------------
        ---  BAKING MIXES    ---             ---------------
        ---  PUDDING         ---             ---------------
        ---  JELLY           ---             ---------------
        ---  CRACKERS        ---             ---------------
        ---  PICKLES         ---             ---------------
        ---  MILK            ---             ---------------
        ---  EGGS            ---             ---------------
        ---  COLD CUTS       ---             ---------------
        ---  FROZEN MEAT     ---             ---------------
        ---  TUNA            ---             ---------------
        ---  FROZEN DESERTS  ---             ---------------
        ---  SUGAR           ---             ---------------
        ---  PEPPER          ---             ---------------
        ---  COOKING OIL     ---             ---------------
```

A SPECTRUM PROJECTS SHOPPING LIST

SUPER CHIP -SALE- ...

6821 Standard PIA ~~$9.95~~	$6.95
Basic ROM 1.1 Chip ~~$19.95~~	$9.95
6847 VDG Chip ~~$19.95~~	$12.95
6809E CPU Chip ~~$19.95~~	$12.95
CoCo III Multipak - "NEW" PAL chip (For Gray and White 26-3024 models ONLY)	$19.95
Orig SAM Chip (6883) ~~$29.95~~	$19.95
Basic ROM 1.3 (Newest version)	$19.95
68766 EPROM - (Fits all Basic ROMS)	$19.95
Disk ROM 1.1 - (Needed for CoCoIII)	$29.95
New SAM Chip with heatsink (74LS785)	$29.95
Ext Basic 1.1 ROM - NEW LOW PRICE	$29.95
CoCo First Aid Kit - includes two PIA's, 6809E CPU and SAM Chips ~~$59.95~~ (BE PREPARED)	$39.95
EPROM Programmer - uses 2716s up to 27512s! Super fast programming! - See April '86 review	$149.95

COCO LIBRARY ...

A History of the CoCo / 1980-1986	$6.95
New! 200 MORE Pokes,Peeks 'N Execs	$9.95
Basic Programming Tricks Revealed	$14.95
CoCo Memory Map	$16.95
500 Pokes, Peeks 'N Execs	$16.95
A Guide to CoCo III GRAPHICS	$19.95
Basic 09 Tour Guide	$19.95
New! New! CoCo II Service Manual (Specify CoCo II Catalogue model number)	$29.95
CoCo III Service Manual	$39.95
The Complete Rainbow Guide to OS9	$19.95
Guide with Two Disk Package of demo pgms	$49.95
Color/Extended/Disk Basic Unraveled - A completely commented disassembly of the CoCo ROMS! Comprehensive three (3) Book Set - Save $10!	$49.95

MORE GOOD STUFF ...

WICO Adapter- Hookup 2 Atari type joysticks.	$19.95
CoCo Keybd - Low profile, fits all CoCo IIs & "F"s WAS $39.95 - NOW $19.95. D/E CoCo I adapter	$12.95
WICO Trackball - Regularly $69.95, Now only.	$24.95
Universal Video Drvr- All monitors & CoCos	$29.95
(2) Chip 64K Upgrade - 26-3134 A/B CoCo II	$29.95
28 pin Ext Basic - 26-3134 A/B CoCo II	$34.95
Computize "Y" Box - Better than a Y cable	$39.95
KAMELEON Parallel Printer Interface	$49.95
Top FD-501 Drive 1 (#26-3131) - SAVE $60	$139.95
COCO III DISK DRIVE 0	**$239.95**
512K COLOR COMPUTER III	**$299.95**

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COCO CABLES AND ...

Printer/Modem 15' Extender Cable	$14.95
Tired of unplugging devices from your RS232 port? Try a RS232 "Y" Cable	$19.95
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Disk Drive Cable (34pin - 34pin)	$19.95
Modem Cable - 6ft (DB25-DB25)	$19.95
Joystick/Mouse 10' Ext Cable	$19.95
Dual Disk Drive Cable (3-34pin)	$24.95
MAGNAVOX 8505/8515 Analog RGB cable	$24.95
Other Analog RGB monitor cable (Specify!)	$39.95
15" Multi-Pak/Rom Pak Extender - Move your Multi-ROM Paks further away	$29.95
40 Pin Dual "Y" Cable - Hook up a Disk with a Voice Pak, Word Pak, CoCo Max, etc.	$29.95
Triple RS232 Switcher - Now easily select any one of three RS232 peripherals	$39.95
40 Pin Triple "Y" Cable - Hook up any three (3) Voice/Word/RS232/Digitizer PAKs	$39.95

OTHER GOOD STUFF ...

C-10 tapes in any quantity	59 cents
5 1/4" Diskettes, any quantity	79 cents
Rompak w/Blank PC Board 27xx series	$9.95
Video Clear - This cable will reduce TV interference created by CoCo!	$19.95
The Magic Box - Load Mod I/III Basic program tapes into the CoCo	$24.95
Deluxe RS-232 PAK - ~~$39.95~~ Now only	$29.95
DOS Switcher - Select from any two DOSs (Disk 1.0 1.1, JDOS) in a J&M disk controller	$29.95
Orig CoCoI "D" Rev motherboard. Includes all chips (SAM, CPU, PIA's) except RAM and Ext Basic!	$39.95
"D" Rev motherboard w/o socketed chips	$16.95
256K RAM Chips (Set of 8)	$39.95
HJL-57 Keyboard - CoCo III version! Comes complete with special FREE Function Key Software	$59.95
HDS Controller w/1.1 ROM (SAVE$20)	$79.95
Super Controller - Up to 4 DOSs by a POKE	$99.95
1200 Baud Modem(Hayes compatible) Auto-dial/answer $139.95. Req's Modem cable (4pin or DB25)	$19.95
Amdek Drive System with controller	$239.95
GEMINI Printer - 120cps, NLQ mode	$249.95
MAGNAVOX 8515 RGB Analog monitor	$349.95

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COCO HOT LINE
718-835-1344

SPECIAL 64K RAM CHIPS $19.95

The program was designed for a DMP-120 printer, but you can change the control codes in lines 30, 40, 60, 90 and 210 *to adjust them* to your printer. You can also change or add items by adjusting the `DATA` lines beginning with Line 260. Happy shopping!

The listing: `GROCERY`

```
5 REM GROCERY LIST
6 REM BY DONALD LARGE
7 REM NORTH SYRACUSE,NY  1984
10 POKE 150,41
20 FOR Z= 1 TO 10
30 PRINT#-2,CHR$(27) CHR$(19)
40 PRINT#-2,CHR$(27) CHR$(14)
50 PRINT#-2,"  SHOPPING LIST"
60 PRINT#-2,CHR$(27) CHR$(15)
70 RESTORE
80 X$="           ---":Y$="-----
----------":Z$="---"
90 PRINT#-2,CHR$(27) CHR$(20)
100 PRINT#-2,,"ITEM","COUPON","B
RAND",,"ITEM","COUPON","BRAND"
110 PRINT#-2,"     *************
********************************
********************************
********************************
***********"
120 PRINT#-2
130 FOR A= 1 TO 41
140 READ A$,B$
150 PRINT#-2,X$,A$,Z$,Y$,X$,B$,Z
$,Y$
160 NEXT A
170 PRINT#-2,"SPECIAL INSTRUCTIO
NS:"
180 FOR A = 1 TO 5
190 PRINT#-2,"------------------
--------------------------------
--------------------------------
--------------------------------
------------------"
200 NEXT A
210 PRINT#-2, CHR$(27) CHR$(19)
220 FOR V= 1 TO 8
230 PRINT#-2
240 NEXT V
250 NEXT Z
260 DATA FRESH VEG.,FROZEN VEG.,
CANNED VEG.,IN.POTATOES,CEREAL,F
LOUR,RICE,PANCAKE MIX,BAKING MIX
ES,JELLO,PUDDING,PEANUT BUTTER,J
ELLY,COOKIES,CRACKERS,SOUP,PICKL
ES,OLIVES,MILK,CHEESE,EGGS,BUTTE
R
270 DATA COLD CUTS,MEAT,FROZEN M
EAT,CANNED MEAT,TUNA,FROZEN DINN
ERS,FROZEN DESERTS,ART.SWEETN'R,
SUGAR,SALT,PEPPER,SPICES,COOKING
 OIL,CATSUP,MUSTARD,MAYONAISE,ST
EAK SAUCE,SALAD DRESSING,RELISH,
SYRUP
280 DATA BREAD,HOTDOG BUNS,HAMBU
RG BUNS,DINNER ROLLS,MUFFINS,SOD
A,LO-CAL SODA,BEER,KOOL AID,DOG
FOOD,CAT FOOD,CLEANSER,FURN.POLI
SH,BATTERIES,UTENSILS,GLUE,TAPE,
VITAMINS,ASPRIN,SOAP,LAUNDRY DET
ERG.
290 DATA SOFTENER,STARCH,BLEACH,
HAND LOTION,SHAMPOO,RAZOR BLADES
,SHAVING CREAM,GARBAGE BAGS,STOR
AGE WRAP,NAPKINS,PAPER PLATES,PA
PER CUPS,LUNCH BAGS,TOILET PAPER
,FEM.PRODUCTS,OTHER,OTHER,OTHER,
OTHER
```

16K
ECB

Who's On First

By John Fugh, Jr.

This is a program that produces a score card for those who keep score of baseball games. It is designed to work on a DMP-105 printer.

The listing: `BASEBALL`

```
10 GOTO 40
20 PRINT#-2,CHR$(27);CHR$(28);
30 RETURN
40 POKE 282,0
50 CLS:INPUT"ENTER THE HOME TEAM
";HOME$
60 INPUT"ENTER THE AWAY TEAM";AW
AY$
70 POKE 282,255
80 J=-2
90 PRINT#J,HOME$" vs. "AWAY$
100 GOSUB 20
110 K$=CHR$(241)
120 L$=CHR$(243)
130 H$=CHR$(242)
140 GOTO 500
150 PRINT#J,CHR$(240);STRING$(15
,CHR$(241));L$;STRING$(5,K$);L$;
STRING$(5,K$);L$;STRING$(5,K$);L
$;STRING$(5,K$);L$;STRING$(5,K$)
;L$;STRING$(5,K$);L$;STRING$(5,K
$);L$;STRING$(5,K$);L$;STRING$(5
,K$);H$
152 RETURN
```

<<<<< COLORFUL UTILITIES >>>>>

MULTI-PAK CRAK

Save ROMPAKs to your 64K Disk system using the RS Multi-Pak Interface. Eliminate constant plugging in of ROMPAKs now by keeping all your PAK software on disk. Includes POKEs for "PROBLEM" ROMPAKs- including the NEW 16K PAKS! (Demon Attack,Dragons Lair,etc) Now CoCo III compatible! (Upgrade $15 w/proof of purchase) $29.95

TELEPATCH III

All the FEATURES of TELEPATCH plus the classically proportioned characters of the WIZARD with TRUE lowercase! Now CoCo III compatible! (Upgrade $15 w/proof of purchase) $29.95

DISK UTILITY 2.1A

A multi-featured tool for USER FRIENDLY disk handling. Utilize a directory window to selectively sort, move, rename and kill file entries. Lightning fast Disk I/O for format, copy and backup. Examine contents of files, the Granule Table, plus the size, load addresses and entry points of all programs. Single command execution of both Basic and ML programs. 32K/64K DISK **$29.95** Now also CoCo III compatible! Upgrade only $15 w/proof of purchase. (see Oct'84 Rainbow Review)

SPECTRUM FONT GENERATOR

Write files using any CoCo Word Processor (Telewriter-64, VIP Writer, etc.) and convert them to special Highly Detailed character sets! Some of the sets supported are Italics, Old English, Futuristic and Block. A character set editor is included to create or modify custom sets! Supports most dot-matrix printers! DISK **$29.95** (see Dec '85 Rainbow Review)

NEW!

COCO III SOFTWARE BONANZA PACKAGE

Create an instant library of Spectrum Projects TOP CoCo III software!!! Get FONT BONANZA, FKEYS III, C III GRAPHICS and CoCo III UTILITIES (a $100 plus value) for only **$49.95!!!**

COCO GRAPHIC DESIGNER

Create custom greetings for any occasion: Birthdays, Anniversaries, Holidays, etc. Also BANNERS & SIGNS! Includes "GRABBER" utility - capture Hi-Res CoCo screens for your GRAPHIC LIBRARY! Easy to use & comes with a set of pre-drawn graphics. Includes a screen & font editor. 32K DISK **$29.95**

64K DISK UTILITY PACKAGE

Take advantage of an expanded 64K machine. Make an additional 8K of RAM available by relocating the Ext Basic ROM from $8000 to $D800. Copy ROMPAKS to disk (even "protected" PAKS) and create a 32K SPOOL buffer for printing. DISK **$24.95**

TAPE/DISK UTILITY

A powerful package that transfers tape to disk and disk to tape automatically. Does an automatic copy of an entire disk of programs to tape. Ideal for Rainbow On Tape to disk. Also copies tape to tape & prints tape & disk directories. TAPE/DISK **$24.95** (see Sept '83 Rainbow Review)

COCO III UTILITIES

Terrific utility support programs for the new Color Computer III! Includes a CoCo II to CoCo III converter, 32K Hi-Res screen saver, 40/80 column Word Processor, RAM tester, DEMO BALL generator, SMOOTH scrolling demos. 128K DISK **$24.95**

THE OS-9 SOLUTION

NOW, a program that creates a "USER FRIENDLY" environment within OS-9! The OS-9 SOLUTION replaces 19 of the old "USER HOSTILE" commands with single keystroke, menu driven commands. No more complex long pathnames or remembering complicated syntaxes! Set all XMODE parameters at the touch of keys! $39.95 New LOW price!!! **$24.95** (OS-9 Level II compatible!!!)

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Create an instant library of Spectrum Projects TOP Colorful Utility software. Select any of the following 12 programs to customize your own SPECTACULAR SOFTWARE BONANZA! CoCo Checker, Multi-Pak Crak, CoCo Screen Dump, Disk Utility 2.1, Spectrum Font Generator, Tape/Disk Utility, Fast Dupe II, 64K Disk Utility, Spectrum DOS, CoCo Calendar, Schematic Drafting Processor, OS-9 Solution, Basic Plus, EZ Base or Blackjack Royale (a $300 plus value) for only **$99.95!!!**

NEW!

COCO POTPOURRI

CoCo Checker $19.95
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CoCo Calendar ...$19.95

Fastdupe III ...$19.95
GRAPHICOM $24.95
EZ Base $24.95

Spectrum DOS ...$29.95
Spit'N'Image ...$34.95
CoCo Util II ...$39.95

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COD add $2 extra
NYS Residents add Sales Tax
CoCo HOT LINE 718-835-1344

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```
160 PRINT#J,G$;STRING$(15,CHR$(2
24));G$;STRING$(5,F$);G$;STRING$
(5,F$);G$;STRING$(5,F$);G$;STRIN
G$(5,F$);G$;STRING$(5,F$);G$;STR
ING$(5,F$);G$;STRING$(5,F$);G$;S
TRING$(5,F$);G$;STRING$(5,F$);G$
162 RETURN
170 PRINT#J,CHR$(244);STRING$(15
,K$);D$;STRING$(5,K$);D$;STRING$
(5,K$);D$;STRING$(5,K$);D$;STRIN
G$(5,K$);D$;STRING$(5,K$);D$;STR
ING$(5,K$);D$;STRING$(5,K$);D$;S
TRING$(5,K$);D$;STRING$(5,K$);CH
R$(249)
175 RETURN
180 PRINT#J,CHR$(246);STRING$(15
,K$);S$;STRING$(5,K$);S$;STRING$
(5,K$);S$;STRING$(5,K$);S$;STRIN
G$(5,K$);S$;STRING$(5,K$);S$;STR
ING$(5,K$);S$;STRING$(5,K$);S$;S
TRING$(5,K$);S$;STRING$(5,K$);CH
R$(247)
182 RETURN
499 END
500 S$=CHR$(248):D$=CHR$(250):F$
=CHR$(224):G$=CHR$(245):GOSUB150
510 FORX=1TO5:GOSUB160:NEXTX
515 GOSUB170
520 FORX=1TO12:FORZ=1TO5:GOSUB16
0:NEXTZ:GOSUB170:NEXTX
530 FORZ=1TO5:GOSUB160:NEXTZ:GOS
UB180
540 PRINT#-2,CHR$(27);CHR$(54):P
RINT#-2,"Totals>  ";CHR$(15);HOM
E$"        "AWAY$;CHR$(14)
550 PRINT#-2,"Hits>":PRINT#-2,"E
rrors>":PRINT#-2,"Runs>"
```

16K ECB

Recipe Printer

By Keith March

Here is a nifty little program to help you print out your recipes on continuous 3-by-5 file cards. When you run this program, it prompts you for the name of your recipe (maximum of 41 characters long), then asks you to set the margin. The screen will look like this:

```
LM 2         RM 23

PRESS E TO STOP
PRESS L TO SET L. MARGIN
PRESS R TO RUN AGAIN
```

Now you can type in the ingredients; press ENTER after each one. If you want the ingredients listed on the recipe card in two columns, type what you want to go in the left column first, then press L and ENTER. The screen should look like this:

```
LM 25         RM 49

PRESS E TO STOP
PRESS L TO SET L. MARGIN
PRESS R TO RUN AGAIN
```

Roll your printer back to the top of the first ingredient in the left column, then type in what you want in the right column. After you have finished typing in the ingredients, press L, then 3. Your screen should look something like this:

```
LM 2         RM 49

PRESS E TO STOP
PRESS L TO SET L.MARGIN
PRESS R TO RUN AGAIN
```

```
EGG SALAD SANDWICH FILLING


6 hard-boiled eggs
1/2 cup chopped celery
1/3 cup mayonaise
1/4 tsp salt



Mix all ingredients together.

Makes enough filling for about
six sandwiches.
```

Now type in the instructions for the recipe and press ENTER.

The listing: RECIPE

```
1 ' RECIPE MAKER
2 ' BY KEITH H. MARCH
3 ' FOR CONTINUOUS 3X5 FILE CARD
S
4 ' ON THE NX-10 PRINTER
5 ' (C) 12/1/86
6 CLEAR 2000
```

```
7 CLS:POKE 15Ø,1
8 P=-2:POKE 282,255
9 PRINT" RECIPE MAKER
              BY
         KEITH  MARCH"
1Ø PRINT:LINEINPUT"IS YOUR PRINT
ER ON  (Y OR N)";D$
11 IF D$="N" THEN 7 ELSE CLS:GOT
O 12
12 PRINT#P,CHR$(27);"8";'
          PAPER-OUT OFF
13 LINEINPUT "          RECIPE N
AME           (MAX. CHARS. & OR
SPACES IS 41):";R$
14 PRINT#P,CHR$(27);CHR$(1Ø8);CH
R$(1);'   LEFT MARGIN
15 PRINT#P,CHR$(27);CHR$(81);CHR
$(49);'   RIGHT MARGIN
16 PRINT#P,CHR$(27);"a";CHR$(1);
'         CENTERED PRINTING
17 PRINT#P,CHR$(27);CHR$(15);'
          COMPRESSED
18 PRINT#P,CHR$(27);CHR$(1Ø4);CH
R$(1);R$' DOUBLE-SIZE
19 PRINT#P'
          SPACE
2Ø PRINT#P,CHR$(27);"@";'
          RESET
21 LL=Ø:RR=Ø
22 INPUT " LEFT MARGIN (1, 2 OR
3)";LM
23 IF LM=1 THEN LL=2:RR=23
24 IF LM=2 THEN LL=25:RR=49
25 IF LM=3 THEN LL=2:RR=49
26 PRINT#P,CHR$(27);CHR$(1Ø8);CH
R$(LL);'   LEFT MARGIN
27 PRINT#P,CHR$(27); CHR$(81);CH
R$(RR);'   RIGHT MARGIN
28 PRINT#P,CHR$(27); CHR$(65);CH
R$(1Ø);'   LINE-FEED
29 PRINT#P,CHR$(27);CHR$(15);'
          COMPRESSED
3Ø CLS:POKE 282,Ø
31 PRINT@1,"LM";LL,"RM";RR
32 PRINT " PRESS <E> TO STOP"
33 PRINT " PRESS (L) TO SET L. M
ARGIN"
34 PRINT " PRESS (R) TO RUN AGAI
N"
35 LINEINPUT " ";E$
36 IF E$="E" OR E$="e" THEN PRIN
T#P,CHR$(27);"@";:CLS:NEW
37 IF E$="L" OR E$="l" THEN 2Ø
38 IF E$="R" OR E$="r" THEN PRIN
T#P,CHR$(27);"@";:GOTO 1
39 PRINT#P,E$
4Ø GOTO 3Ø
```

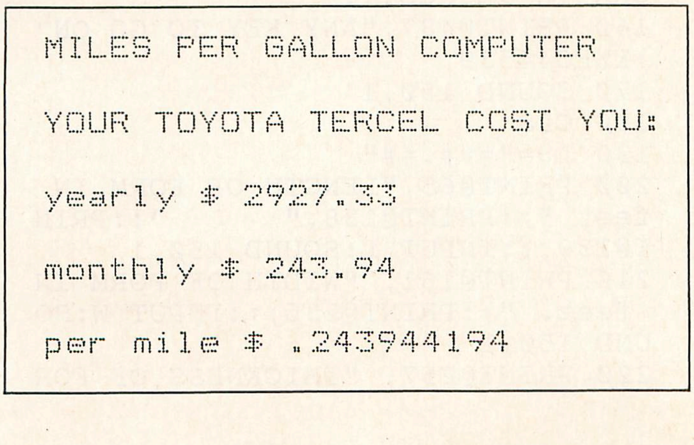
Auto Economy

By J.E. Borger

16K
ECB

At last, everything you always wanted to know about how much that car of yours is costing you, but were afraid to ask! *MPG* can figure your average yearly or monthly auto costs, and even break it down to cost per mile.

All you need are approximate costs of yearly insurance, maintenance, average price paid for gasoline, monthly car payment and number of miles you drive each year. After entering this data, CoCo will figure the costs. This is also an excellent way to "comparison shop" for a car, since you can use this program to figure the cost of any car, not just your own.



```
MILES PER GALLON COMPUTER

YOUR TOYOTA TERCEL COST YOU:

yearly $ 2927.33

monthly $ 243.94

per mile $ .243944194
```

The listing: MPG

```
1Ø CLS:'m.p.g.(J. E. BORGER 9/85
)
2Ø PRINT"    MILES PER GALLON CO
MPUTER"
3Ø FOR L=1 TO 64:PRINT"*";
4Ø NEXT L
5Ø PRINT#X,""
6Ø PRINT"USE THIS PROGRAM TO FIG
URE YOUR mpg,(AND A LITTLE BIT M
ORE!)
7Ø PRINT#X,""
8Ø INPUT "   SCREEN OR PRINTER(S
/P)";A$
9Ø IF A$="S"THEN X=Ø
1ØØ IF A$="P"THEN X=-2
11Ø IF A$="P" THEN PRINT#-2,"MIL
ES PER GALLON COMPUTER"
12Ø CLS
13Ø CLS:PRINT@224," ALREADY KNOW
 THE MPG? (Y/ )":FOR T=1 TO 15Ø:
NEXT T:PRINT@224," ALREADY KNOW
THE MPG   ( /N)":FOR T=1 TO 15Ø:N
EXTT:I$=INKEY$:IF I$<>"Y"AND I$<
>"N"THEN 13Ø
14Ø CLS5
15Ø IF I$="Y"THEN 33Ø ELSE 16Ø
```

```
160 CLS
170 INPUT"WHAT KIND OF CAR DO YO
U DRIVE  ";C$
180 CLS1
190 INPUT "HOW MANY MILES SINCE
YOUR LAST  FILL-UP";MI
200 CLS
210 INPUT "EXACTLY HOW MUCH GAS
DID IT TAKE TO FILL UP THIS TIME
";GS
220 PRINT#X,""
230 CLS
240 PRINT#X,"YOU DROVE"MI"MILES
AND CONSUMED "GS" GALLONS OF GAS
"
250 PRINT#X,""
260 PRINT#X,"      THE EXACT mpg
FOR YOUR "
270 PRINT#X,"        "C$" IS "MI/GS
;
280 PRINT#X,""
290 FOR K=1 TO 2000:NEXT K
300 '
310 MG=MI/GS
320 GOTO 350
330 INPUT "MAKE OF CAR";C$
340 INPUT"WHAT'S THE MPG";MG
350 PRINT#X,""
360 INPUT "HOW MUCH DO YOU NORMA
LLY PAY FOR GASOLINE (PER GALLON
)";GG
370 CLS
380 INPUT"WHAT IS YOUR YEARLY IN
SURANCE    PREMIUM";IP
390 CLS
400 INPUT "HOW MANY MILES(AVG) D
O YOU DRIVE PER YEAR";ML
410 CLS
420 INPUT"WHAT IS YOUR MONTHLY C
AR PAYMENT";CP
430 CLS6
440 PRINT"WHAT IS YOUR YEARLY MA
INTENANCE COSTS?"
450 INPUT"(TUNE-UP,SERVICE,OIL,T
IRES ETC.)";YM
460 CLS8
470 PRINT#X,""
480 CLS:PRINT#X,"YOUR "C$" COST
YOU:"
490 PRINT#X,""
500 PRINT#X,"yearly $";:PRINT#X,
USING" ####.##";(YM)+(CP*12)+(IP
)+((ML/MG)*(GG))
510 PRINT#X,""
520 PRINT#X,"monthly $";:PRINT#X
,USING"####.##";(YM/12)+(CP)+(IP
/12)+((ML/MG)*(GG/12))
530 PRINT#X,""
540 PRINT#X,"per mile $"((YM)+(C
P*12)+(IP)+((ML/MG)*(GG)))/(ML)
550 PRINT:PRINT:PRINT
560 INPUT"AGAIN";A$
570 IF A$="Y" THEN 10 ELSE PRINT
#X,"THANK YOU"
```

16K ECB

CoCo Yields The Floor

By Burt Gonce Jr.

This program calculates the amount of cement necessary for any specific job. All you have to do is enter the length and width of the form in feet, and the depth in inches. Then, presto! CoCo tells you how much cement you need, to pour the form.

The listing: CEMENT

```
100 REM****THIS PROGRAM WRITTEN
BY BURT GONCE, JR.  RT 1 BOX 137
 BEAVERDAM, VIRGINIA, 23015
110 REM****1982********
120 CLS
130 'THIS IS A PROGRAM TO FIGURE
 HOW MUCH CEMENT YOU NEED TO POU
R A SPECIFIC SIZE FORM..
140 PRINT@32,"THIS IS A PROGRAM
TO FIGURE THE AMOUNT OF CEMENT T
HAT YOU WILL  HAVE TO ORDER FOR
YOUR SPECIFIC FORM......"
150 PRINT@192,"ENTER LENGTH AND
WIDTH OF THE   FORM YOU HAVE BUI
LT IN feet..":PRINT@255," ENTER
THE DEPTH OR THICKNESS OF YOUR F
ORM IN inches..."
160 PRINT@487,"ANY KEY TO GO ON"
:EXEC44539
170 SOUND 150,1
180 CLS
190 L$="###.##"
200 PRINT@65,"LENGTH OF FORM IN
feet ";:PRINT@138,"      ";:PRIN
T@139,;:INPUT L:SOUND 150,1
210 PRINT@161, "WIDTH OF FORM IN
 feet. ";:PRINT@235,;:INPUT W:SO
UND 150,1
220 PRINT@257, "THICKNESS OF FOR
```

```
M IN inches ":PRINT@331,;:INPUT
T
230 X=L*12
240 Y=W*12
250 Z=T/12
260 P=L*W
270 Q=Z*P
280 CLS
290 PRINT@64,;
300 PRINT"**********-----------*
*********"
310 PRINT"YARDS OF CEMENT TOO. O
RDER  FOR THIS POUR ";
320 PRINT USING L$;Q/27
330 PRINT"**********-----------*
*********"
340 PRINT@453,"ANY KEY TO DO ANO
THER"
350 PRINT@489,"OR q TO QUIT"
360 EXEC 44539
370 A$=INKEY$:IF A$="Q"THEN 390
ELSE 380
380 GOTO 180
390 POKE 113,0:EXEC 40999
```

4K

Checks And Balances

By John Musumeci

This is a simple program to help balance your bank account if you have some pesky outstanding checks. When you run the program, it asks for your balance according to the bank statement. Then, just enter any outstanding checks, one at a time. (There is room for seven.) The program will calculate the correct balance for your checkbook.

The listing: CHECKS

```
1 '*****CHECKS*****
2 '****************
3 '***WRITTEN BY***
4 '*JOHN MUSUMECI**
5 '**103-57 104 ST*
6 '**OZONE PARK,***
7 '***NEW YORK,****
8 '*****11417******
9 '**718-738 0212**
10 CLS(4)
20 PRINT@172,"CHECKS";
30 FOR X=1 TO 460*6
40 NEXT X
50 CLS
60 PRINT@128,"WHAT IS STATEMENT
BALANCE"
70 INPUT B
80 FOR X=1 TO 460*5
90 NEXT X
100 CLS
110 PRINT@32,"LIST OUTSTANDING C
HECK OR ENTER"
120 INPUT CA
130 PRINT@96,"NEXT CHECK OR ENTE
R"
140 INPUT CB
150 PRINT@160,"NEXT CHECK OR ENT
ER"
160 INPUT CC
170 PRINT@224,"NEXT CHECK OR ENT
ER"
180 INPUT CD
190 PRINT@288,"NEXT CHECK OR ENT
ER"
200 INPUT CE
210 PRINT@352,"NEXT CHECK OR ENT
ER"
220 INPUT CF
230 PRINT@416,"NEXT CHECK OR ENT
ER"
240 INPUT CG
250 FOR X=1 TO 460*3
260 NEXT X
270 CLS
280 FOR X= 1 TO 460*5
290 NEXT X
300 A=B-(CA+CB+CC+CD+CE+CF+CG)
310 PRINT@101,"CHECKBOOK BALANCE
 IS:"
320 PRINT @268,A
330 FOR X=1 TO 460*30
340 NEXT X
350 END
```

Contributions to "Novices Niche" are welcome from everyone. We like to run a variety of short programs that can be typed in at one sitting and will be useful, educational and fun. Keep in mind, although the short programs are limited in scope, many novice programmers find it enjoyable and quite educational to improve the software written by others.

Program submissions must be on tape or disk. We're sorry, but we do not have the time to key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

— Jutta Kapfhammer
Submissions Editor

16K
ECB

CoCo Conquers the Metric System

By Fred B. Scerbo
Rainbow Contributing Editor

Editor's Note: If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. Remember, keep your ideas specific, and don't forget that this is BASIC. All programs resulting from your wishes are for your use, but remain the property of the author.

Just when things look darkest, someone comes to the rescue! That's the way things sometimes seem. Well, the "Wishing Well" is no exception to that observation. Those of you who have followed the column in recent months probably know the problem I have been facing: a lack of realistic and practical wishes from my readers. The clatter of my line printer had barely subsided after completing my March submission, and already I was starting to worry about where the April "Wishing Well" would go.

The next day's mail helped solve that problem as few letters have in the past. Not only did the reader's letter bring an uplift to my day, but out of it came a very practical wish that sends our "Wishing Well" into the world of metrics with a new addition to the Life Skills Series: *The Metric System—Measuring in Meters.*

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

The Letter

Mr. John A. McGoldrick of Brooklyn, New York, wrote me a letter received at the RAINBOW offices on Christmas Eve (how appropriate!). Mr. McGoldrick wrote:

"First, I should like to express my sincere gratitude to you and RAINBOW for the fine educational programs you have been supplying my five children who are all in elementary school. I have one tape devoted to math programs and you can be sure that *Number Relation*, which appeared in this January's RAINBOW, will join *Math Driller* and the numerous other fine programs which have helped my children in learning math and in becoming computer literate."

Everyone needs a little positive feedback and Mr. McGoldrick's letter was a needed shot in the arm. Some of you may recall I have stated that when I write an educational program, it is my hope that it get the widest possible use (short of outright piracy by those who would try to resell it). As a teacher of special needs students, I take great satisfaction in knowing that someone in another city has benefited from an educational program I was able to list in these pages. You can't put a price tag on that kind of satisfaction, believe me. Mr. McGoldrick continues . . .

"My seventh grade daughter, Theresa, was recently quizzed on the metric system and was totally annihilated, as were her classmates. I checked the past two annual indices of RAINBOW magazine hoping for a program on the metric system which would help my daughter. Unfortunately, there was none.

"I think such a program would be very beneficial. If the child could learn and understand the relationships that are developed between the numbers by grasping and understanding the roots—milli, kilo, etc. — the child could be taught that by remembering one equivalent he can work out the others. Hoping you can implement this idea."

Now here was an idea I could sink my teeth into. Quite honestly, I had never even thought of doing the metric system because most of my math students never get that far. (Even though I teach at the high school level, many of my learning disabled students have severe math problems. Progress is slow, with some students only reaching a fourth or fifth grade math level.)

So, my thanks go out to you and your family, Mr. McGoldrick. Your sincere letter helped dislodge a brief mental block. Now let's get down to business.

Typing in the Program

`LIFESKL6`, as it is listed on both RAINBOW ON TAPE and RAINBOW ON DISK, is designed to fit in a 16K Color BASIC machine without Extended BASIC. Those with a 16K Extended machine may have to type `PCLEAR1` and press ENTER before using the program. The program will also work on the MC-10 with 20K.

You will also notice I have left out use of `ELSE` in the `IF-THEN` statements as well as the `STRING$` command, both of which are missing from MC-10 BASIC. Since there are no pokes or peeks, no changes are required in the listing to make it work on either machine. (This does not mean you can load a CoCo tape of this program directly into the

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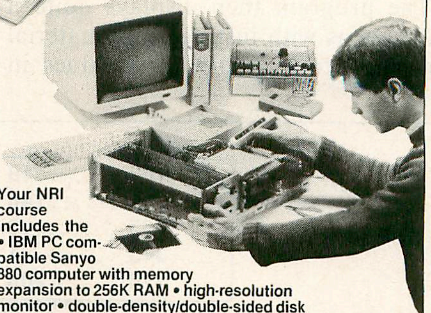

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MC-10. The tokens are different in each machine. Only the written listings are the same.)

One thing you will notice about this listing as you type it in, is that there are many, many `DATA` statements in it. It is very important that you type in these `DATA` statements exactly as you see them, even if they do not seem to make sense. Every space and every comma should line up on your screen exactly as they do in the 32-column listing found on these pages.

The program includes a subroutine that prevents wordwrap on the sentences displayed on the screen. Since some displays will be charts, it is important that you include all the spaces shown in the `DATA` statements. (In fact, I can't remember ever writing a program with this much data; however, there is a reason for this.)

Please do not send me your listing of this program (even with an SASE) asking me to debug your typing errors. Sorry, I simply do not have the time to answer requests such as these and still create a new program each month.

Using the Program

This program is designed to do two things: instruct and quiz. On running the program, you will see our familiar Life Skills screen and can choose to review or quiz the material. Naturally, the first time you use it, you should press R for review.

The program then displays quite a few screens with instructional material regarding relationships and values in the metric system, particularly, measuring with meters. You may proceed through each statement by pressing the ENTER key. The user is not expected to commit this material to memory. It can be reviewed a number of times to make the child more familiar with these values.

Some of the material will be displayed in chart form because it can be more easily understood that way. All of the "root" definitions, such as "kilo" and "centi" are clearly defined, with examples given. I have attempted to cover this material in as simple and clear a manner as possible. If you want to add additional statements to this listing, you may insert them between any of my `DATA` statements. However, you must always add at least two, or an even number of statements. Otherwise, you may throw off the remaining data.

This information is found between lines 390 and 515. I have, as a rule, put two sentences in each line. Be careful not to use any commas in your punctuation unless you wrap each sentence in quotes. For example:

```
401 DATA "ONE, TWO AND THREE",
"F OUR, FIVE AND SIX"
```

Notice how a comma is used between each set of quotes. Remember, you cannot add an odd number of sentences. Most of you will not need to add anything to the program. Anything you add will be properly spaced on the screen automatically. (In fact, this program can almost be used as a programmed reader.)

At the end of the information, the screen prints out instructions for the quiz part of the program. Here is how the quiz works.

Two values are printed on the screen, such as:

```
A) 2 MILLIMETERS
B) 20 METERS
```

You must choose the larger value, by pressing either A or B. The screen will indicate whether or not your answer is correct and will highlight the correct answer. Press ENTER to move on to the next example.

Pressing the @ key at any time gives you the scorecard. It displays our usual quiz data, and gives you the choice to continue by pressing C, to quit by pressing N for no, or to run the whole program again by pressing Y for yes. The student can use the program as long as you want. The two values will never be equal, so you do not have to worry about that problem coming up.

Conclusion

I hope many other families will find this kind of educational program useful. I hope to do several more involving skills in using the metric system. However, I always welcome suggestions that are as helpful as Mr. McGoldrick's. Maybe you can come up with some of your own, as well. ☐

100	19	440	139
165	146	480	235
265	3	510	157
345	1	END	55
410	208		

The listing: LIFESKL6

```
10 REM***************************
15 REM* LIFE SKILLS MATH DRILL *
20 REM*    THE METRIC SYSTEM    *
25 REM*   MEASURING IN METERS   *
30 REM*    BY FRED B.SCERBO     *
35 REM*      60 HARDING AVE     *
40 REM*  NORTH ADAMS,MA 01247   *
45 REM*   COPYRIGHT (C) 1987    *
50 REM***************************
55 CLS0:FORI=1TO32:PRINTCHR$(188
);:NEXT
60 FORI=1TO192:READA:IFA=0THENA=
16
65 PRINTCHR$(A+128);:NEXT
70 FORI=1TO32:PRINTCHR$(179);:NE
XT
75 DATA109,104,96,109,104,100,11
0,108,106,109,108,109,,,30,28,26
,29,,,30,20,30,20,30,16,20,30,,2
1,28,29
80 DATA101,,,101,,,106,96,104,10
1,,100,,,26,,24,21,16,22,16,,26,
,26,,16,26,,21,,20
85 DATA101,,,101,,,107,106,96,10
1,99,98,,,27,19,18,21,22,16,,,26
,,26,,16,26,,21,19,19
90 DATA101,,,101,,,106,104,,101,
,,,,,,26,21,20,18,,,26,,26,,16,2
6,,,,21
95 DATA101,,106,101,,,106,,,101,
,97,,16,26,,26,21,,20,18,,26,,26
,21,16,26,21,21,,21
```

```
100 DATA103,99,106,103,98,97,107
,,,103,99,103,,,27,19,26,23,18,,
27,17,27,17,27,23,17,27,23,21,19
,23
105 PRINT@293,"  THE METRIC SYST
EM  ";
110 PRINT@325," MEASURING IN MET
ERS  ";
115 PRINT@357,"   BY FRED B.SCER
BO  ";
120 PRINT@389,"  COPYRIGHT (C) 1
987  ";
125 PRINT@453,"  (R)EVIEW OR (Q)
UIZ  ";
130 DIMA$(50),B$(50),C(7)
135 Q=143:FORI=1TO7:C(I)=Q+(I*16
):NEXT
140 FORI=1TO7:READP$(I),P(I):NEX
TI
145 DATA MILLIMETERS,1,CENTIMETE
RS,10,DECIMETERS,100,METERS,1000
,DECAMETERS,10000,HECTOMETERS,10
0000,KILOMETERS,1000000
150 SW=30
155 GOTO190
160 IF LEN(JK$)<=SW THEN180
165 FOR T=SW TO 0STEP-1:IF MID$(
JK$,T,1)=" "THEN175
170 NEXT T:GOTO180
175 L$=LEFT$(JK$,T):W$=L$:GOSUB1
85:JK$="    "+RIGHT$(JK$,(LEN(JK$
))-T):GOTO160
180 W$=JK$:PRINTW$:RETURN
185 PRINTW$:RETURN
190 FORJ=1TO50:READ A$(J),B$(J):
IF A$(J)="END" THEN200
195 NEXTJ
200 X$=INKEY$:IFX$=""THEN200
205 IFX$="R"THEN220
210 IFX$="Q"THEN255
215 MU=RND(-TIMER):GOTO200
220 CLS0:FORI=1TOJ-1:C=RND(7):FO
RY=1TO32:PRINTCHR$(C(C));:NEXTY:
PRINT@64,"";:JK$="    "+A$(I):GOS
UB160
225 FORY=1TO32:PRINTCHR$(128);:N
EXTY:FORY=1TO32:PRINTCHR$(C(C));
:NEXTY:FORY=1TO32:PRINTCHR$(128)
;:NEXTY
230 IFINKEY$<>CHR$(13)THEN230
235 JK$="    "+B$(I):GOSUB160
240 FORY=1TO32:PRINTCHR$(128);:N
EXT:FORY=1TO32:PRINTCHR$(C(C));:
NEXTY
245 IFINKEY$<>CHR$(13)THEN245
250 CLS0:NEXT
255 CLS0:N(1)=RND(7)
260 N(2)=RND(7):IFN(2)=N(1)THEN2
60
265 C=RND(7)::FORI=1TO32:PRINTCH
R$(C(C));:NEXTI:FORI=1TO32:PRINT
CHR$(128);:NEXTI:PRINT
270 PRINT"   WHICH OF THESE IS G
REATER ?"
275 V=RND(9):NN(1)=P(RND(4))*V:N
N(2)=P(RND(4))*V
280 NV(1)=P(N(1))*NN(1):NV(2)=P(
N(2))*NN(2):IFNV(1)=NV(2)THEN275
285 PRINT:PRINT"     A) ";NN(1);
P$(N(1))
290 PRINT:PRINT"     B) ";NN(2);
P$(N(2)):PRINT
295 IFNV(1)>NV(2)THENR$="A"
300 IFNV(2)>NV(1)THENR$="B"
305 FORI=1TO32:PRINTCHR$(128);:N
EXTI:FORI=1TO32:PRINTCHR$(C(C));
:NEXTI:FORI=1TO32:PRINTCHR$(128)
;:NEXTI
310 X$=INKEY$:IFX$=""THEN310
315 IFX$="@"THEN520
320 IFX$="A"THEN335
325 IFX$="B"THEN335
330 GOTO310
335 IFX$=R$THEN345
340 PRINT"  SORRY, BUT THAT IS N
OT RIGHT!":NW=NW+1:GOTO350
345 PRINT"  YES, YOUR ANSWER IS
CORRECT!":NC=NC+1
350 FORI=1TO32:PRINTCHR$(128);:N
EXT:FORI=1TO32:PRINTCHR$(C(C));:
NEXT
355 IFR$="A"THEN LC=161
360 IFR$="B"THEN LC=225
365 X$=INKEY$
370 PRINT@LC,")=>";:FORI=1TO50:N
EXTI:PRINT@LC,"   ";:FORI=1TO50:
NEXTI
375 IFX$="@"THEN520
380 IFX$=CHR$(13)THEN255
385 GOTO365
390 DATA OUR CENTRAL UNIT OF MEA
SURE IN THE METRIC SYSTEM IS CAL
LED THE METER.,IT IS EQUAL TO 39
.37 INCHES
395 DATA ONE METER IS ALSO EQUAL
 TO 3.28 FEET.,ONE METER IS ALSO
 EQUAL TO 1.09 YARDS.
400 DATA MOST COUNTRIES IN THE W
ORLD OTHER THAN THE UNITED STATE
S USE THE METRIC SYSTEM.,THE MET
RIC SYSTEM IS EASY TO USE BECAUS
E ALL MEASURING UNITS ARE IN POW
ERS OF TEN (10).
405 DATA NOW WE WILL LOOK AT THE
 DIFFERENT UNITS WHICH MAKE UP T
HE METRIC SYSTEM.,WE WILL DEAL O
```

```
NLY WITH UNITS OF LENGTH BASED O
N THE METER.
410 DATA WE CAN DIVIDE A METER U
P INTO TEN (10) EQUAL PARTS.,EAC
H ONE OF THESE PARTS IS CALLED A
 DECIMETER.
415 DATA THE ROOT 'DECI' MEANS '
ONE-TENTH' SO A DECIMETER IS ONE
-TENTH OF A METER.,THERE ARE TEN
 (10) DECIMETERS IN A METER.
420 DATA WE COULD ALSO DIVIDE A
METER UP INTO ONE HUNDRED (100)
EQUAL PARTS.,EACH ONE OF THESE P
ARTS IS CALLED A CENTIMETER.
425 DATA THE ROOT 'CENT' MEANS '
ONE-HUNDREDTH' SO A CENTIMETER I
S ONE-HUNDREDTH OF A METER.,THER
E ARE ONE HUNDRED (100) CENTIMET
ERS IN A METER.
430 DATA WE COULD ALSO DIVIDE A
METER UP INTO ONE THOUSAND (1000
) EQUAL PARTS.,EACH ONE OF THESE
 PARTS IS CALLED A MILLIMETER.
435 DATA THE ROOT 'MILLI' MEANS
'ONE-THOUSANDTH' SO A MILLIMETER
 IS ONE-THOUSANDTH OF A METER.,T
HERE ARE ONE THOUSAND (1000) MIL
LIMETERS IN A METER.
440 DATA LET'S LOOK AT THE RELAT
IONSHIPS BETWEEN THESE UNITS., 1
 METER =    10 DECIMETERS 1 METER
 =  100 CENTIMETERS 1 METER = 10
00 MILLIMETERS
445 DATA WE CAN CHANGE METERS (M
) TO DECIMETERS (DM) BY MULTIPLY
ING BY TEN (10).,5 M X 10 = 50 D
M
450 DATA WE CAN CHANGE DECIMETER
S (DM) TO CENTIMETERS (CM) BY MU
LTIPLYING BY TEN (10).,7 DM X 10
 = 70 CM
455 DATA WE CAN ALSO CHANGE CENT
IMETERS (CM) TO MILLIMETERS (MM)
 BY MULTIPLYING BY TEN (10).,4 C
M X 10 = 40 MM
460 DATA WE HAVE UNITS WHICH ARE
 LARGER THAN A METER.,TEN (10) M
ETERS IS KNOWN AS A DECAMETER.
465 DATA THE ROOT 'DECA' OR 'DEK
A' MEANS TEN.,DECAMETER OR DEKAM
ETER MEANS TEN METERS.
470 DATA THE ROOT 'HECTO' MEANS
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475 DATA THE ROOT 'KILO' MEANS O
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.,7 HECTOMETERS X 100 EQUALS 700
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490 DATA TO FIND HOW MANY METERS
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).,3 KILOMETERS X 1000 EQUALS 30
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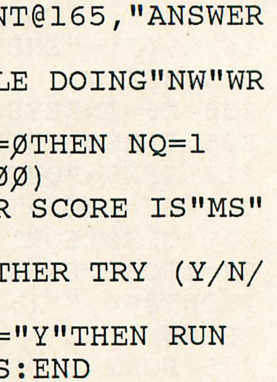
HECTOMETER =     100 METERS DECAM
ETER  =      10 METERS METER
 =    1 METER  DECIMETER  =
1/10 METER  CENTIMETER =  1/100
METER  MILLIMETER = 1/1000 METER
500 DATA HERE IS A BRIEF QUIZ AB
OUT WHAT WE HAVE JUST COVERED.,Y
OU WILL BE GIVEN TWO METRIC VALU
ES ON THE SCREEN.
505 DATA YOU WILL BE ASKED TO PI
CK THE VALUE WHICH IS GREATER.,S
IMPLY PRESS THE LETTER (A) OR (B
) NEXT TO YOUR CHOICE.
510 DATA YOU MAY STOP THE QUIZ A
NYTIME BY PRESSING THE <@> KEY.,
PRESS <ENTER> TO BEGIN THIS SHOR
T METRIC QUIZ.
515 DATA END,END
520 CLS:PRINT@101,"YOU TRIED"NC+
NW"PROBLEMS &":PRINT@165,"ANSWER
ED"NC"CORRECTLY"
525 PRINT@229,"WHILE DOING"NW"WR
ONG."
530 NQ=NC+NW:IF NQ=0THEN NQ=1
535 MS=INT(NC/NQ*100)
540 PRINT@293,"YOUR SCORE IS"MS"
%."
545 PRINT@357,"ANOTHER TRY (Y/N/
C) ?";
550 X$=INKEY$:IFX$="Y"THEN RUN
555 IFX$="N"THENCLS:END
560 IFX$="C"THEN255
565 GOTO550
```



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Practical information on protecting your work

Computer Program Copyrights: A How-to Guide

By Edward Samuels

You've written a nifty computer program, you're proud of it, and you're thinking of contacting a software house to see if you can sell it. What should you do to protect your rights in the program?

Although other avenues of legal protection may be available, your most effective protection will probably be under the federal copyright law. Under that law, you have several "exclusive rights," including the exclusive rights to make copies of your program and to distribute copies to the public. As a *practical* matter, anyone may make copies of your work or distribute copies to others. However, as a *legal* matter, you have the right to sue them for damages if you learn that they have "infringed" any of your exclusive rights, and to get a court injunction to force them to discontinue their infringing activities.

Your copyright, although intangible, is like property, in that you can sell it to other people. Or you can license other people to copy and distribute your work for a royalty fee. Your copyright generally continues until 50 years after your death, so that your heirs will theoretically benefit from your rights.

Edward Samuels, a professor of law at New York Law School, has taught copyright and other legal subjects for more than 10 years. An avid reader of RAINBOW, Professor Samuels enjoys sharing his CoCo with his children, 8-year old Richard and 4-year old Claire.

How do you get this wonderful legal protection? It's actually very simple, although what you have to do depends to some extent on what you intend to do with your program. If you simply plan to use your program at home or at work, without distributing it to others, you really don't have to do anything. Federal copyright protection is automatic, and begins from the moment you make a copy of your work. If someone sneaks into your home and steals a copy of your program and starts selling it (assuming you can prove that's what they did, which is not necessarily easy to do), then you have the right to sue them to recover for any damages they have caused. You need *not* have done anything to "get" your copyright, because you had it all along.

When you start distributing your work to other people, you do need to write on all such copies a copyright notice, which should look like this: "Copyright© 1987 by Edward Samuels" — substituting your own name and the date of first publication of your program. If, for example, you make your program available to others through a computer network, or give it to friends, this simple notice informs everyone that you retain all rights of copyright, and that you may sue them if they infringe your exclusive rights by making or distributing copies without your permission. Since it's so easy, and since it's absolutely free, you should make a habit of always writing the magic words — Copyright© (date of publication) (your name) — at the beginning of all your computer programs.

One more thing you can do to protect your rights is register your computer program with the copyright office. This registration is accomplished by filling out the appropriate form and sending it, with a copy of your program and a $10 registration fee, to the copyright office in Washington. Such registration is *not* a prerequisite to copyright protection, but it does enhance your rights to some extent. You probably need to register only if you plan to sell the program commercially, but it's up to you to decide if you want to go to the slightly greater trouble to more fully protect your rights.

In the following sections of this article, I will explain in greater detail the few simple steps we have just outlined — obtaining your copyright (automatically), including the magic words of copyright notice in your program when you publish it, and, if you decide to do it, registering your work. In the final section, we will briefly consider just a few basic copyright principles that, alas, may limit your copyright in significant ways.

Some of these principles may be hard to understand. But the beauty of the copyright law is that it may be used even by people who don't fully understand how it works! The car, the television and the VCR are great inventions precisely because they can be used even by people who don't know how they work. (To some extent, this is true of computers, though I've never been able to convince my father of this.) If you can drive a car without being a mechanic, you can have a copyright without being a lawyer. Just as you wouldn't set out on a long trip without having a mechanic check out your car, you shouldn't get into the business of selling programs without consulting an attorney. But for the casual writer of programs, getting the copyright is not all that difficult.

When Copyright Protection Starts

Everything I am about to say is governed by the Copyright Act of 1976 (which I will call "the Act"), so it may not apply to works created before January 1, 1978, the effective date of that act. This is federal law, so it is uniform throughout the United States and not subject to state variation. If you live in or plan to publish the work in another country, then obviously you need to consult the law of that country.

> ***"If you can drive a car without being a mechanic, you can have a copyright without being a lawyer."***

Federal copyright in a computer program begins as soon as the program is "fixed in any tangible medium of expression." This means it is protected when it has been incorporated into a "material object," such as a printed listing, or a tape or disk copy. I will assume that other CoCo users are at least as paranoid as I am, and make multiple saves and listings of all programs, so that this prerequisite to federal copyright protection shouldn't be a problem. If you are the rare person who trusts your creation to the insides of your temperamental CoCo, without making at least one copy, then an attorney is not the only professional you need to consult!

Copyright Notice

Although federal copyright protection of a computer program is automatic as soon as the programmer makes a physical copy of it, there is an important requirement *when the work is published* (that is, when you distribute it or *even offer* to distribute it to others, whether in a magazine, via a bulletin board, or by individual copies). At such time, the copyright notice generally must be written upon all those publicly distributed copies. It is obviously easiest to assure this by placing the copyright notice on *all* copies, whether they are intended for publication or not.

There is, under the current law, a "savings" provision for protecting certain works that may have been published without the appropriate notice, by registering the work within five years of first publication and adding the notice to subsequently distributed copies. However, it is unwise to rely upon the savings provision, since it may lose you some rights against persons who make copies without knowing that you claim rights in the work.

Once a work is published without notice, and once the five years for invoking the savings provision have passed, the work will go into the public domain; once a work is in the public domain, it can *never* be retrieved by the author. Therefore, it is best always to use the copyright notice, since it costs you nothing to add it. (I assume that you do not intentionally use the notice to claim copyright in works which you did not write, because if you do that you may be subject to criminal penalties.)

Form of the Notice

The copyright notice requires three things: 1) the symbol © (the letter 'C' in a circle), the word "Copyright," or the abbreviation "Copr."; 2) the year of first publication of the work; and 3) the name of the owner, or an abbreviation or designation by which the owner is known. For the first part of the notice, you really should try to use both the word copyright and the 'C' in a circle. The symbol is necessary in order to trigger international protection under a treaty the United States has signed with most other major countries. As the symbol is not a standard character on the CoCo or on most printers, you should either design your own character for display on a high resolution screen and for printing on your printer, or add the circle to your listings by hand. Many computer programmers use parentheses — (c) — but it is not clear that this has any significance under the treaty that governs the United States' copyright relations with most other countries.

The second part of the notice, the year of first publication, refers to the year that the work was first made available to others by any means. If you are in doubt — if, for example, you showed a listing to several friends in your local computer club in 1985, but didn't sell copies of the program until 1987 — then it is safer to use the earliest possible date. If you pick a year that is later than that in which you technically "published" the work, your copyright notice might be ineffective.

You will normally be the copyright owner, and should use your own name in the notice. If you wrote the program in the course of your work for someone else, or for a company, then that person or company may be the copyright owner. If so, they probably have a standard procedure for placing copyright notices on their works. If some other person or company is distributing your copyrighted computer program, it is advisable to provide in writing (saving a copy, of course) a statement that, as a condition of your authorization to distribute copies of the work, the work must contain the required notice. Then, if the notice is accidentally omitted, your copyright will not be invalidated.

> ***"It's awfully nifty getting an official certificate of registration from the copyright office, formally certifying your authorship of the program."***

Position of the Notice

The copyright notice, in the form just described, should be placed in such a way as to give reasonable notice to others. There are at least three likely places where you can put the notice, and I would recommend using all three. The first is in the listing of the program, preferably near the beginning. This is most easily accomplished using a numbered line with `REM` or `´` (apostrophe) followed by the copyright notice, as follows:

```
10 REM Copyright © 1987
by Edward Samuels
```

Even if you encode the program so that it *cannot be easily* listed, or you write your program in assembly language, it should contain the copyright notice embedded within it, so that someone copying the program will copy the notice, or someone disassembling it will find it.

The second logical place to put the notice is on the CoCo screen when the program is run, most logically as part of the sign-on or title screen. The third place to put the notice is on the labels attached to the tapes or disks on which the program is stored, if the program is publicly distributed on tapes or disks.

If you are submitting a program for publication by a magazine or newsletter, the publication's copyright notice at the beginning of the issue will also protect your individual program. Unless you specifically transfer your copyright in the program to the magazine or newsletter, it will be presumed that you remain the copyright owner, and that the magazine acquired only a limited right to reproduce the work as part of that particular issue or another issue in the same series. If, however, you sign a contract transferring your program copyright to the magazine or newsletter, make sure you are satisfied with what you're paid because after you sell it, the work is no longer yours.

Copyright Registration

So, as we have just seen, a computer program is protected from the moment it is written down or stored, without any formalities whatsoever. If and when you distribute copies of the work, you must affix the copyright notice to it — a relatively simple procedure. In addition, you may register your work with the copyright office, but it is not necessary to do so in order to be protected by copyright. Why, then, would you ever want to go to the trouble of registering your work? The answer is that you obtain several distinct advantages through registration — most of which assume that your work is "worth" something, and that you may someday want to sue someone who copies or distributes your program without your permission.

Advantages of Registration

The major advantages of registration are the following:

1) Registration tends to prove that you wrote your program when you say you did. This could be indispensable if you sue someone who claims that he or she wrote the program first, and that you're the one who copied.

2) Even if you don't register your work, you will be able to recover for any damages caused by someone else's unauthorized copying of your work. Such damages are often hard to prove, and won't include your attorney's fees, which could easily cost more than your provable damages. If you do register, however, you qualify to recover not only reasonable attorney's fees if you win your suit, but also something called "statutory damages," meaning that a judge can award you a monetary recovery even if you can't prove specific damages.

3) If you should accidentally omit the copyright notice from some published copies of your work, registration of the work within five years of publication will help you save the copyright from being invalidated.

4) In any event, you must register a work before you sue for infringement.

5) It's awfully nifty getting an official certificate of registration from the copyright office, formally certifying your authorship of the program.

How to Register a Work With the Copyright Office

Assuming you want to go to the trouble of registering, it is really not all that difficult. First, you obtain Form TX by calling the "Forms Hotline" at (202) 287-9100 day or night, or writing to Information and Publications Section, LM-455, Copyright Office, Library of Congress, Washington, D.C. 20559. While you're at it, ask for Circulars R1 (on copyright basics) and R61 (on computer programs in particular). Don't panic when you see that the form is for a "nondramatic literary work." Under the copyright registration system, that's the category that computer programs fall into. If you want to separately register the audiovisual display of your program, you should do so on Form VA, which is for a work of the visual arts. (I will not go into the protection of audiovisual displays, except to mention that in some cases it has proven effective in protecting the presentation of materials on the screen, primarily audiovisual games.)

Follow the instructions for completing and returning the form to the copyright office. Your application must be accompanied by a $10 payment and by a deposit of one or two copies of the program. If you publish a listing of the program, you should include two copies of the program as published. If the program is unpublished, or if you distribute copies of your program only on cassettes or disks, then you should send one copy of the program "in visually perceptible form" — that is, as listed to a printer.

If your program is written in assembly code, the copyright office wants the source code, not merely the unintelligible object code. This may result in disclosing what you might regard as a trade secret. For this reason, many computer software companies have not generally registered their works, instead preferring to preserve their "trade secrets" under theories of law other than copyright. If you have distributed a work written in BASIC, you would normally have no expectation that your code represents a secret, so you might as well register and deposit your work. If you have distributed your program using limited protection schemes such as auto-loaders or programs that prevent listing, and you honestly think that a good programmer wouldn't be able to list your program anyway, you might decide not to register.

The copyright office allows the authors of long programs to deposit only portions of those programs, and has proposed the adoption of rules that would also allow the authors of short programs (25 pages or less) to withhold up to 50 percent of their listing. The rule may well go into effect sometime in 1987.

Other Copyright Basics

There are numerous copyright principles that have the effect of limiting your rights in your computer program. Although these limiting principles are too complex to explain fully in this short article, I should at least mention some of the more important ones.

For example, the copyright law protects only the parts of your program that are "original." This doesn't mean that the program has to be particularly creative or innovative, but it must be the result of your *own* programming. If you copy a program listing from RAINBOW magazine, it isn't *your* computer program, and you cannot claim any rights in it.

Similarly, if you use someone else's subroutine for writing letters on a `PMODE 4` screen, you can't claim authorship of that subroutine either. If you develop your own subroutine and character set, then that's sufficiently original to qualify for copyright protection, even though something similar may have been done dozens of times by others. Original, in short, means little more than "not copied."

Your copyright is said to protect your "expression," but not your "idea." Other people are free to write programs that do the same thing as yours, so long as they don't copy your specific program. For example, your copyright in a program for solving Rubik's Cube won't prevent other people from writing programs that solve Rubik's Cube, so long as their programs don't copy your program. Several recent court decisions indicate that the copyright in a computer program is fairly broad, and not limited to verbatim copying of copyrighted programs. However, drawing the fine line between the protected "expression" and the unprotected "idea" can sometimes be quite tricky.

Purchasers of a particular copy of a copyrighted computer program have the right to resell that particular copy. Purchasers may also make a back-up copy (assuming they are able to make one, if it is copy-protected) or even an adaptation that is "an essential step in the utilization of the computer program in conjunction with a machine." For example, a modification to a program written for the CoCo 2 to get it to run on a CoCo 3, or the elimination of the speed-up poke to get it to run on a CoCo that won't handle it, would presumably not be considered an infringement of the owner's copyright.

And, of course, no matter what the law may say, you just *know* that people out there are copying your program, and as a practical matter you will never find out and never be able to do anything about it. But why spoil the fun? Let's not dwell on the negative side of copyright protection. For now, tape a copy of your copyrighted program to the wall, beside your copyright certificate if you have one, and enjoy the special feeling of accomplishment for having created something that didn't exist before.

(Questions about this article may be addressed to Professor Samuels at New York Law School, 57 Worth Street, New York, NY 10013. Although he is interested in discussing copyright matters of general interest to computer programmers and users, he is not currently engaged in the practice of law, and will not give specific legal advice. If you have a serious copyright problem, you should consult an attorney who specializes in the field.

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Programming the LOGO Turtle: Studies in Learning Transfer

By Michael Plog, Ph.D
Rainbow Contributing Editor

One concept of learning is "transfer" — skills we learn in one situation are carried over (transferred) into another situation. The most expansive interpretation of this concept is that some subjects actually teach students to think better. In the past, subjects have been included in school curricula because they were assumed to help students learn the process of thinking or creativity. Courses were thought to help in all other subjects because they presented a logical method of thinking about everything. Some of you may have taken Latin in school with this justification.

Some teachers have claimed that learning to program a computer would change the way students learn everything else. One influential proponent of this position is Seymour Papert, developer of the computer language LOGO. Using the LOGO language, children send commands to a "turtle," which then draws pictures on a computer screen. By learning to program the turtle, the argument went, children would learn also to think.

Michael Plog received his doctorate degree from the University of Illinois. He has taught social studies in high school, worked in the central office of a school district and is currently employed at the Illinois State Board of Education.

Papert developed LOGO during the 1970s. During the 1980s, researchers tested whether or not children programming the computer actually did think any better (or differently) than children without that experience. The evidence is mixed.

Roy Pea, Midian Kurland and other colleagues at Bank Street College of Education in New York City conducted experiments with elementary and secondary school students to determine the effects of transfer of learning. They found no evidence that students learn much from programming that can transfer to non-electronic problems.

The first experiment began by exposing 16 students in grades three through six to 30 hours of self-initiated work with LOGO. They then gave a task to these children and to members of a comparison group. The task was to design an efficient plan for completing six classroom cleanup activities. The assumption of the researchers was that drawing with the LOGO turtle requires the same sort of forethought and analysis of a space as organizing housekeeping chores; however, the LOGO group planned no better than the comparison children.

The teachers of the LOGO children, once they saw the results of the experiment, decided to include more structured lessons and group discussions in the LOGO work the following year. A second study was conducted. This time, encouraging students to use what they learned from LOGO, the planning task was put on a microcomputer. Again, the LOGO children produced no better plans than those in the comparison group. In addition, they did not make better use of computer feedback, think longer as they planned, or revise more intelligently.

The researchers conducted a third study. This study involved high school students with two years of programming experience and a comparison group of students without programming experience. The researchers were looking for improvements in several problem-solving skills. The computer science students performed better than the comparison group only on one test that tapped their programming work in an obvious way. Other tests came out with no difference.

Pea, Kurland and their colleagues concluded that programming instruction, as it is now conducted, will not improve general thinking skills of students.

Other researchers have found a more positive connection between programming and thinking. Douglas Clements and Dominic Gullo of Kent State University in Ohio conducted an experiment with first graders. The students worked in groups of two or three on LOGO programming tasks for 80 minutes a week. The control group consisted of children who worked on computers for reading and math lessons, but did not learn programming. After only 12 weeks, differences were noted among the LOGO children and the control group. The children learning programming gave much better directions when told to describe the route from A to B on a simple street map. They also thought longer and made fewer errors on a picture-matching task; generated more original ideas on a test of creative thinking; and asked questions sooner when faced with inadequate directions. Apparently, programming experience seems to make a difference in this study.

> ***"Low road transfer demands little conscious thought."***

The Kent State study differed from the Bank Street studies in several ways. It is impossible to determine which of these differences account for the different results. The Kent State study had students working in groups of two or three with an adult tutor. The tutor encouraged them to think aloud about mistakes, tracing the source of errors. (What did you tell the turtle to do? What did it do? How can you change your program to get it to do what you want?) The students in the Kent State study were also younger. (A later study involving first and third grade students found that first graders learned more than older children.) The tasks performed by the students were different in the two studies; different skills were measured.

The major difference seems to be involvement of adults. The Bank Street researchers found that the elementary students learned new ideas as solutions to very specific problems and rarely generalized to closely related programming problems. The high school students in the Bank Street study borrowed programming code from each other without really understanding it. The tutors in the Kent State study encouraged a much broader sort of learning.

Beyond the differences of the studies, the contradictory results may be resolved by a consideration of the way people learn to transfer skills from one context to another. Psychologists describe two different methods of knowledge transfer: the "high road" and the "low road."

Low road transfer demands little conscious thought. Once we have learned to drive a car, we can drive a truck without too much problem. Once students can read a book, they can easily read words scrolling across a computer screen. Low road transfer occurs when a skill becomes automatic (after practice) and is then applied to a new, but similar situation.

High road transfer involves a conscious effort to apply past experience to a particular problem. The learner has to consciously abstract a principle learned in one context to a different situation. For example, in feudal Japan and China, military leaders used a board game called "Go" to improve performance in battle. Mao Tse-tung actually wrote a book about his conquest of China by comparing it to a Go game. Closer to home, executives apply principles from chess (control of the center of the board) to business strategies.

This high road transfer requires an understanding of the principles involved before applying them to a new context. The effort has to be conscious, unlike the skill of riding a bicycle.

Courses in programming typically involve little stress on principles of problem-solving. Most classes deal with fundamentals, leaving the students to learn more advanced programming skills on their own. As students work in computer classes, they are not expected to reflect on broader abstractions to other problem-solving situations. They are expected to write a program that will calculate interest payments, alphabetize a list of names or draw a map.

It seems we can safely disregard the low road transfer of skills when considering things like problem-solving and learning. Might it be possible to design a computer class that intentionally tries to teach broad problem-solving skills? What materials would be used to encourage students to learn principles of thinking that could be used for a high road transfer? What teaching style should be associated with such a class? I have no answers, but maybe you do. Are you involved with a class that you think has potential for high road transfer of learning? If you have such a class, please tell me about it. Maybe we can test your students to see if your approach indeed contributes to transfer of higher order thinking.

Your thoughts, comments, ideas and suggestions are welcome. Write me at 829 Evergreen, Chatham, IL 62629. Until later, keep thinking of the high road.

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Transistor Buffers for Stereo Amplification

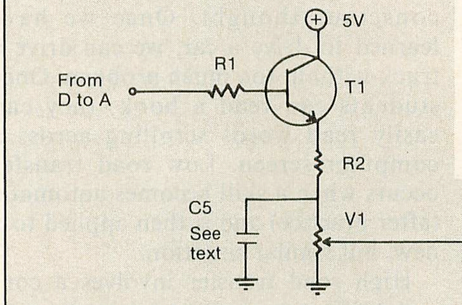
By Tony DiStefano
Rainbow Contributing Editor

Last time, I showed you how to wire digital-to-analog converters. A D-to-A converter is a device that, when hooked up to a computer, converts (or changes) a digital value, or number into an analog voltage. In the case of the CoCo, the digital value is from 0 to 255, represented as an eight-bit binary value. Remember binary? Anyway, this eight-bit binary value is converted into a voltage. The voltage output is directly proportional to the input value. The lowest possible digital value (0) gives the lowest output voltage, 0 volts. The highest digital value (255) gives the highest voltage. In this case it should be about 5 volts.

This time, I'll show you how to hook up a couple of small amplifiers and get some sound out of them. If you recall, the outputs of the D-to-A converters are the sum of several resistors. This has an output of about 0 to 5 volts. If you want to connect this output to an external amplifier, such as a stereo system, then you don't need an amplifier but just a buffer. The reason you don't need an amplifier is the output voltage is high enough to drive a stereo. In fact, it is a bit too high. The typical input voltage of a "line in" on a stereo is about 1 volt. It needs to be brought down a little. Figure 1 shows one transistor buffer. It is an emitter-follower. It has a lot of current gain but no voltage gain. This is what we need. R2 in the circuit is used to lower the voltage to a usable level for the stereo. V1 in the circuit is used as a volume control. If you only build one

---

Tony DiStefano is a well-known early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.



Parts List

Part Number	Description
R1	10K resistor, ¼ watt
R2	47K resistor, ¼ watt
T1	2N2222 transistor
V1	10K variable resistor
J1	RCA female connector

Figure 1

Part Number	Description
R3	100 ohm resistor, ¼ watt
R4	10K resistor, ¼ watt
C1	.1 Uf Cap., 50 volts
C2	.1 Uf Cap., 50 volts
C3	4.7 Uf Cap., 10 volts
C4	470 Uf Cap., 35 volts
C5	See text
I1	LM 386 audio amp
V2	10K varible resistor
S1	2 to 4 inch speaker
J2	4-pin connector

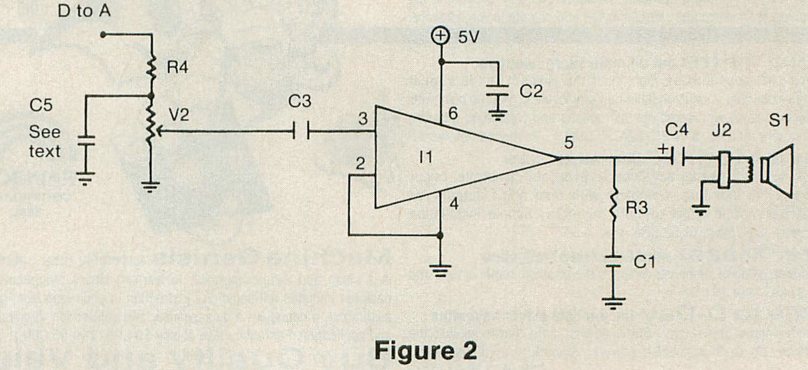


Figure 2

D-to-A converter you only need one circuit. If you build two D-to-As then you need two circuits. But instead of using two volume controls and adjusting them separately, use a stereo volume control that has two potentiometers built into one.

If your stereo is too far away or you don't have a stereo, then you may want to build a small amp to drive some speakers. Figure 2 shows a circuit that does just that. It is an amplifier module that has just a few milliwatts. In fact it has 325 milliwatts, just right for a small speaker.

All of the parts are available at your local Radio Shack store. If you used the CRC Project board, then there should be enough room left on the board to mount all of the parts. If you want to use a socket for the IC, then use an 8-pin socket. There is no special care needed in the construction of the amp, except the usual care in dealing with parts that can be damaged by static electricity. The usual project tools will be necessary; things like a soldering iron, pliers, cutters and a drill to mount the variable resistor. Hook up the circuit as in the diagram. The capacitor C2 should be as close to the IC as possible; It's a power supply decoupling cap, so the closer the better. J1 is just a 4-pin connector so if you want to disconnect the speakers, you won't have to unsolder the thing every time.

The way the outputs are connected now, the signal coming from the D-to-A is very square. That is to say, it is very fast to change from one analog state to another. This tends to make the music very rich in harmonics, sometimes to the point that it may sound like distortion. C5 in the circuit acts as a low pass filter by shorting out high frequencies to ground. If you like the rich sounds of harmonics, leave out C5. Otherwise a value from .1 uf to 1 uf will soften these harmonics. Try several values and use the one that you like best.

Now for the hard part. I say hard because for a hardware buff like me, software is a pain. But, hardware without software is not much good, so I have to deal with it. I looked around to see what I had in terms of musical software. After running through my old RAINBOWs, I found that the machine language routines used to generate four voices did not have listings, but only pages and pages of `DATA` statements. This makes it hard to find the driver routines and change them.

So I decided to give basic guidelines on how to modify them yourself. Inside the CoCo there is a built-in D-to-A converter. It is located at $FF20 or 65312 in decimal. The D-to-A converter you have just built is at $FF40 or 65344, and if you built two D-to-As, the second one is at $FF41 or 65345. The idea is to find the location in memory that matches the address $FF20 and change it to $FF40. One thing to remember is that the address $FF40 is divided into two bytes, since the CoCo can only work with eight bits of information. The first is $FF or 255 in decimal and the second is $20 or 32 in decimal. I wrote a short BASIC program to locate any presence of the address $FF20 and change it to $FF40. This is the program:

```
10 FOR I = &H1500 TO &H7EFF
20 IF PEEK(I)=255 AND PEEK
(I+1)=32 THEN POKE I+1,&H40
30 NEXT I
```

There are a few things to remember with this program. First, `PCLEAR 1` before typing it in. Then, load in your music driver and music and run the program. The memory area covered by this program starts just after the BASIC program and runs to the top of a 32K machine. This is only a guideline on how to find the memory locations; people with good machine language skills will be able to find it with no problems.

After looking through my disks of software, I found that I had the program *Musica2*. I checked the machine language driver and found the point at which the program referenced address was $FF20. I changed it by typing this statement:

```
POKE &H3F79 ,&H40
```

That redirected the output to the external D-to-A I built. It was great. If you are using a multipack, you must do another poke to change the access of the slot that the controller is in, to the slot that the D-to-A is in. There is a simple way of doing that:

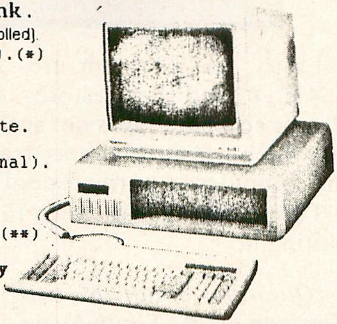
```
POKE &HFF7F , ((X-1) * 16)
+(Y-1)
```

Where *X* is the slot number that the controller is in (a number from 1 to 4), and *Y* is the slot number that the D-to-A converter is in.

To make sure that two D-to-A converters work, I built two of them. I took my machine language disassembler and looked at how the program worked. After a short time, I came up with a stereo version. These are the pokes I did to convert the *Musica2* Play program to use my stereo D-to-A converter:

```
POKE &H3F6F ,&HE6
POKE &H3F73 ,&HEB
POKE &H3F77 ,&HFD
POKE &H3F79 ,&H40
SAVEM"MU2ST",&H3F00,&H3FBF,
&H3F00
```

This will make the modifications necessary to run it on my D-to-As and save a copy of it to disk.



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It All Adds Up

By Bill Carrigan

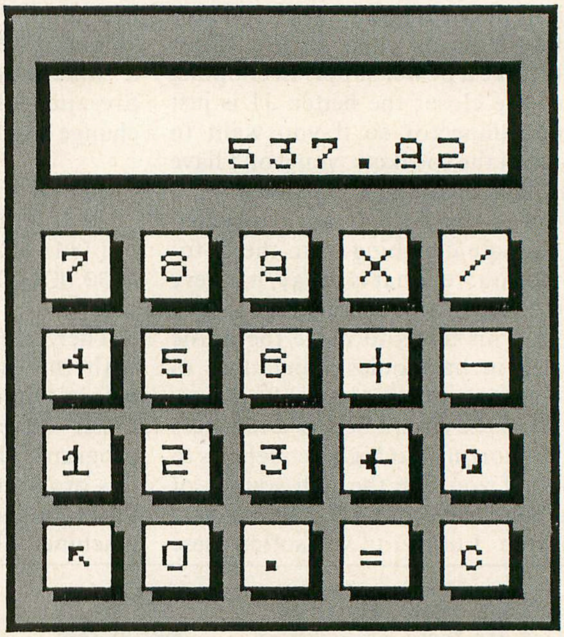
How many times has someone told you that your computer is no more than an oversized calculator? They are more or less right, but you and I both know that to use the Color Computer as a calculator is no easy task. There have been many times when I needed to use my calculator but couldn't find it and had to resort to the computer (it's always in the same place). But trying to perform any volume of calculations was clumsy at best.

With thanks to Peter Kerckhoff (*CoCocad* October 1985) for the polling methods and Apple Macintosh (for the idea), I went about making my Color Computer work like a calculator.

After typing in the program and running it, you are presented with a calculator on the screen. The right joystick controls an arrow cursor that can be moved over the key pad. To select a key, simply position the arrow over the key and press the firebutton. That's all there is to it. The rest should be pretty self-explanatory. If you can operate a calculator, you can use this program.

Two keys not normally found on a calculator are the Q key, which quits the program, and the left arrow, which allows you to delete the last digit entered, rather than clearing and reentering the complete number. The program is easy to modify, so help yourself. I've left a function key empty to do with what you wish.

Bill Carrigan lives in Batavia, New York, and is a computer programmer. His first exposure to computers was a 16K CDC 3100 which filled an entire room. He has been programming large IBM systems for 10 years and has more recently developed an interest in micros.



Lastly, the program uses the high speed poke (`POKE 65495,0`) and then restores it at the end of the program. If your computer does not accept this poke then delete Line 10, which sets the high speed, and Line 1740, which restores the computer to normal speed when you quit the program.

I hope you have as much fun using the program as I did writing it.

(Questions about this program may be directed to Mr. Carrigan at 202 South Swan, Batavia, NY 14020, 716-343-7588. Please enclose an SASE for a reply when writing.) ☐

130	191
290	43
510	112
730	40
940	237
1120	126
1330	90
1510	87
END	67

The listing: COCOCALC

```
10 POKE 65495,0
20 CLEAR 5000:CLS:GOTO200
30 X=INT((JOYSTK(0)+58)*1.31):Y=
(JOYSTK(1)+97):P=ABS((1 AND PEEK
(&HFF00))*3-3)
40 RETURN
50 GET(0,0)-(6,6),C1,G:LINE(0,0)
-(6,6),PRESET,BF:DRAW"S4;BM3,3NF
H2D2E2L":GET(0,0)-(6,6),C2,G:PUT
(0,0)-(6,6),C1,PSET:RETURN
60 GET(X-3,Y-3)-(X+3,Y+3),C1,G:P
UT(X-3,Y-3)-(X+3,Y+3),C2,AND:RET
URN
70 IF (LX<>X) OR (LY<>Y) THEN PU
T(LX-3,LY-3)-(LX+3,LY+3),C1,PSET
:LX=X:LY=Y:GOSUB60:RETURN ELSE R
ETURN
80 PUT(LX-3,LY-3)-(LX+3,LY+3),C1
,PSET:RETURN
90 '
100 '    TEXT GENERATION
110 '
120 IF ASC(E$)>62 THEN 130 ELSE
ON ASC(E$)-31 GOTO 850,860,870,8
80,890,900,910,920,930,940,950,9
60,970,980,990,1000,1010,1020,10
30,1040,1050,1060,1070,1080,1090
,1100,1110,1120,1130,1140,1150
130 ON ASC(E$)-62 GOTO 1160,1170
,1180,1190,1200,1210,1220,1230,1
240,1250,1260,1270,1280,1290,130
0,1310,1320,1330,1340,1350,1360,
1370,1380,1390,1400,1410,1420,14
30
140 '
150 '    DRAW CHARACTER STRING
160 '
170 FOR C=1TO LEN(T$):DRAW"S4;BM
=TX;,=TY;":E$=MID$(T$,C,1):GOSUB
 120:TX=TX+SP:NEXT C:RETURN
180 '    START OF PROGRAM
190 '
200 DIM FF$(5,4),C1(1),C2(1),L1(
6),MO(255):D$="V31L100O3B":SC=4:
LX=3:LY=3
210 PG=0:GOSUB1470:N=3:GOSUB50
220 N=1:FOR Y=3TO1 STEP -1:FOR X
=1TO3:FF$(X,Y)=RIGHT$(STR$(N),1)
:N=N+1:NEXT X:NEXT Y:FF$(2,4)="0
":FF$(3,4)="."
230 SP=8:TY=80:LF=5:B$="":A$="":
SC=4
240 '
250 '    CURSOR POLLING
260 '
270 GOSUB30:GOSUB70:IF P<>3 THEN
 GOTO 270
280 T$="Y"
290 FOR I=83 TO 150 STEP 19:IF (
X>I AND X<I+8) THEN T$="N"
300 NEXT
310 IF T$="N" THEN 270
320 FX=INT((X-71)/19)+1
330 FOR I=105 TO 165 STEP 19:IF
(Y>I AND Y<I+8) THEN T$="N"
340 NEXT
350 IF T$="N" THEN 270
360 FY=INT((Y-93)/19)+1
370 RX=(72+(FX*19)-19):SX=RX+11
380 RY=(94+(FY*19)-19):SY=RY+11
390 GOSUB80:PUT(RX,RY)-(SX,SY),M
O,NOT:PLAYD$:PUT(RX,RY)-(SX,SY),
MO,NOT:GOSUB60
400 ON FY GOTO 410,420,430,440
410 ON FX GOTO 460,460,460,580,5
90
420 ON FX GOTO 460,460,460,600,6
10
430 ON FX GOTO 460,460,460,550,1
740
440 ON FX GOTO 270,460,460,620,6
30
450 '
460 'ADD A NUMBER
470 '
480 IF NC>8 THEN 270
490 IF (INSTR(A$,".") > 0) AND (
FX=3) AND (FY=4) THEN 270
500 NC=NC+1:A$=A$+FF$(FX,FY)
510 LINE(73,63)-(159,81),PRESET,
BF
520 TX=155-(NC*8):T$=A$:GOSUB170
530 GOTO 270
540 ' DELETE A NUMBER
550 IF NC=0 THEN 270
560 A$=LEFT$(A$,LEN(A$)-1):NC=NC
-1
570 IF NC>0 THEN 510 ELSE LINE(7
3,63)-(159,81),PRESET,BF:GOTO270
580 F=1:GOTO670
590 F=2:GOTO670
600 F=3:GOTO670
610 F=4:GOTO670
620 F=5:GOTO670
630 IF A$="" THEN B$="":LF=5 ELS
E A$="":NC=0
640 LINE(73,63)-(159,81),PRESET,
BF:IF B$<>"" THEN T$=B$:TX=155-(
LEN(B$)*8):GOSUB170
650 GOTO270
660 '
670 'PERFORM FUNCTIONS
680 '
690 IF A$="" THEN LF=F:GOTO270
700 IF LF=5 THEN C$=A$:GOTO720
710 ON LF GOSUB 780,790,800,810
720 B$=C$:A$="":NC=0
730 LINE(73,63)-(159,81),PRESET,
BF
740 IF LEN(B$)<10 THEN TX=155-(L
EN(B$)*8):GOTO 770
750 IF VAL(B$)>999999999 THEN B$
=LEFT$(B$,6)+RIGHT$(B$,4) ELSE B
$=LEFT$(B$,10)
760 TX=155-80
770 T$=B$:GOSUB170:LF=F:GOTO270
780 C=VAL(A$)*VAL(B$):C$=STR$(C)
:RETURN
790 C$=STR$(VAL(B$)/VAL(A$)):RET
URN
800 C$=STR$(VAL(B$)+VAL(A$)):RET
URN
810 C$=STR$(VAL(B$)-VAL(A$)):RET
URN
820 '
830 'DRAW STRINGS FOR NUMERICS
    AND ALPHABETICS
840 '
850 DRAW"S=SC;BR4":RETURN
860 DRAW"S=SC;RBU2U2LD2":RETURN
870 DRAW"S=SC;BU2U2BR2D2":RETURN
880 DRAW"S=SC;BRU4BR2D4URL4RU2LR
4":RETURN
890 DRAW"S=SC;R3U2L3U2R3LD4":RET
URN
900 DRAW"S=SC;E4BL3DBR3BD2D":RET
URN
910 DRAW"S=SC;BR2NU4H2R3":RETURN
920 DRAW"S=SC;BRBU4D2":RETURN
930 DRAW"S=SC;BR2HU2E":RETURN
940 DRAW"S=SC;BU2ED2FU2NR3U2":RE
TURN
950 DRAW"S=SC;E5BD5H5":RETURN
960 DRAW"S=SC;BU2R5L2U3D6":RETUR
N
970 DRAW"S=SC;BRU2":RETURN
980 DRAW"S=SC;BU2R5":RETURN
990 DRAW"S=SC;BRURD":RETURN
1000 DRAW"S=SC;E5":RETURN
1010 DRAW"S=SC;BUU3ER2FD3GL2":RE
TURN
1020 DRAW"S=SC;R4L2U5G2":RETURN
1030 DRAW"S=SC;NR4U2R3EUHL3":RET
URN
1040 DRAW"S=SC;BUFR2EUHLE2L4":RE
TURN
1050 DRAW"S=SC;BR3U5G3R4":RETURN
1060 DRAW"S=SC;BUFR2EUHL3U2R4":R
ETURN
1070 DRAW"S=SC;BE4HL2GD3FR2EUHL2
":RETURN
1080 DRAW"S=SC;BRUE3UL4D":RETURN
1090 DRAW"S=SC;BRR2EUHEHL2GFNRGD
":RETURN
1100 DRAW"S=SC;BUFR2EU3HL2GDFR2"
:RETURN
1110 DRAW"S=SC;RULBU2RUL":RETURN
1120 DRAW"S=SC;BU4RDLBD2RD":RETU
RN
1130 DRAW"S=SC;BU2NE2F2":RETURN
1140 DRAW"S=SC;BUR3BU2L3":RETURN
1150 DRAW"S=SC;E2H2":RETURN
1160 DRAW"S=SC;BU3UR3D2LBDD":RET
URN
1170 DRAW"S=SC;NR3U3ER2BD2LDRU":
RETURN
1180 DRAW"S=SC;U3ERFDNL3D2":RETU
RN
```

***
ASSEMBLY
LANGUAGE
PROGRAMMING
TRS-80 COLOR COMPUTER

This hands-on guide begins with the basics and progresses to the expert level. It's written as a tutorial; taking you each step of the way to assembly language programming. First it lays the foundation by explaining binary and hexadecimal numbers. Then the MC6809E microprocessor is explained - internal architecture, addressing modes, and instruction set. Programming guidelines are described including subroutines, stack use, and interrupt handlers. Finally, all the internal secrets of the SAM, PIA, memory, graphics display, joysticks, serial port, cassette, disk, keyboard, ROM, and sound are revealed. All this is presented in a clear and understandable fashion.

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```
1190 DRAW"S=SC;U4R2FGNL2FGL2":RE
TURN
1200 DRAW"S=SC;BRREGLHU2ERF":RET
URN
1210 DRAW"S=SC;U4R2FD2GL2":RETUR
N
1220 DRAW"S=SC;NR3U2NR2U2R3":RET
URN
1230 DRAW"S=SC;U2NR2U2R3":RETURN
1240 DRAW"S=SC;BU4BR3L2GD2FREUL"
:RETURN
1250 DRAW"S=SC;U4D2R3U2D4":RETUR
N
1260 DRAW"S=SC;R2LU4NLR":RETURN
1270 DRAW"S=SC;BUFREU3":RETURN
1280 DRAW"S=SC;U2RNF2NE2LU2":RET
URN
1290 DRAW"S=SC;NR3U4":RETURN
1300 DRAW"S=SC;U4FRED4":RETURN
1310 DRAW"S=SC;U4F3DU4":RETURN
1320 DRAW"S=SC;BUU2ERFD2GLH":RET
URN
1330 DRAW"S=SC;U4R2FGL2":RETURN
1340 DRAW"S=SC;BUU2ERFD2GNUNRLH"
:RETURN
1350 DRAW"S=SC;U4R2FGL2RF2":RETU
RN
1360 DRAW"S=SC;R2EHLHER2":RETURN
1370 DRAW"S=SC;BU4R2LD4":RETURN
1380 DRAW"S=SC;NU4R3U4":RETURN
1390 DRAW"S=SC;BU4D3FREU3":RETUR
N
1400 DRAW"S=SC;NU4ERFU4":RETURN
1410 DRAW"S=SC;UE2UDGHUDF2D":RET
URN
1420 DRAW"S=SC;BU4DFEUDGD2":RETU
RN
1430 DRAW"S=SC;NR2UE2UL2":RETURN
1440 '
1450 '   CREATE SCREEN
```

```
1460 '
1470 PMODE 4,1:SCREEN 1,1:COLOR0
,1:PCLS
1480 LINE(65,50)-(168,170),PSET,
B
1490 LINE(64,49)-(169,171),PSET,
B
1500 LINE(70,60)-(162,84),PSET,B
F
1510 LINE(73,63)-(159,81),PRESET
,BF
1520 FOR X=73 TO 150 STEP 19
1530 FOR Y=95 TO 155 STEP 19
1540 LINE(X,Y)-(X+13,Y+13),PSET,
BF
1550 COLOR 1,0
1560 LINE(X-2,Y-2)-(X+11,Y+11),P
SET,BF
1570 COLOR 0,1
1580 LINE(X-2,Y-2)-(X+11,Y+11),P
SET,B
1590 NEXT Y
1600 NEXT X
1610 A=1:X=75:SC=4:SP=19
1620 T1$(1)="789*/"
1630 T1$(2)="456+-"
1640 T1$(3)="123)Q"
1650 T1$(4)=" 0.=C"
1660 FOR TY=102 TO 161 STEP 19
1670 T$=T1$(A):TX=X:GOSUB170
1680 A=A+1
1690 NEXT TY
1700 TX=44:TY=22:SC=8:SP=10:T$="
COCO CALCULATOR":GOSUB170
1710 TX=40:TY=42:SC=8:SP=10:T$="
BY BILL CARRIGAN":GOSUB170
1720 RETURN
1730 '
1740 POKE 65494,0
1750 END
```

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Checking Into Conference

By Cray Augsburg
Rainbow Technical Editor

Welcome to Delphi Bureau! Those of you who have been with us over the past year or so have certainly seen some changes in the CoCo SIG. We started with very few members, but slowly have gained strength and now, are one of the busiest SIGs on Delphi. While the SIG staff is necessary for such success, the most important ingredient to our success has been you, the SIG member. Your support and suggestions have made the CoCo SIG what it is: an excellent place to meet other computer users interested in the CoCo. Imagine, "talking" online with people from across the United States. Getting immediate help from the CoCo gurus. We have received several requests from the SIG membership for coverage of the SIG Conference on these pages. So, this month, Delphi Bureau will be devoted to Conference commands.

Before I get started, however, I would like to say that all the requests have brought out a very important point. The CoCo SIG membership is steadily increasing. Because of this, we have new members each and every day. These people need our help in learning the ropes. Let us be patient and polite as we guide new members so that they, too, may enjoy the benefits to be found from our SIG.

The CoCo SIG Conference area is a special area on Delphi which is designed so that you can directly interact with other users just as you might talk over a telephone. The main differences are that you can "talk" with more people at the same time, and that you must type instead of vocalize. Conference is just one of many important and beneficial ways to utilize Delphi for the exchange of information. If you need help from a specific user, you can arrange with him via Delphi Mail for a specific time to be online. Then you can page each other into a Conference. This can be one-on-one or an open meeting between several users. Some of you may recall the excellent open conference we held the night of July 30, 1986, the same day the Color Computer 3 was announced. Over 30 people attended the online conference and were able to hear first-hand about the new machine. Yet, Conference can be used even if you just want to say "hello."

To get to the CoCo SIG Conference area, just enter `CO` at the CoCo SIG prompt. If you are at prompt level three, you will be greeted with the Conference menu. Items from this menu are:

`WHO` — This command lists all users online in the CoCo SIG and places parentheses around the names of those users in the Conference area. It also lists the names of the Conference groups already created.

`JOIN` — Allows you to join a group. Just enter `JOIN` *group name*. If the group exists and is not a private group, you will immediately become a member of the group. If it doesn't exist, Delphi will create it and you will become the group leader.

`PAGE` — As its name implies, this

Cray Augsburg is RAINBOW's technical editor and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Ky. His username on Delphi is RAINBOWMAG.

DATABASE REPORT

Our new OS-9 Online Special Interest Group is off to a solid start. We are approaching our first thousand messages in the forum as I write this and, over the last month, the OS-9 Online database has grown significantly. We have now officially closed down the OS-9 topic area on the CoCo SIG and are referring all OS-9 uploads and many OS-9 forum messages to OS-9 Online.

Disk Extended Color BASIC users who have Color Computer 3s, Multi-Paks, and RS-232 packs may be interested in checking out our Data Communications section of the CoCo SIG, where **Rick Adams** (RICKADAMS) has just uploaded *Rickyterm*, a "low voltage guiltware terminal emulator." *Rickyterm* supports 40-and 80-column display, as well as Xmodem file transfer, and offers some unique handling of strings that allows you to have instant single-key access to any string typed in or received on your terminal. This feature can be used to produce interesting effects in conference, permits auto-dialing, and facilitates a number of other applications.

New in the OS-9 Online Database

In the OS-9 Online SIG's general topic area, Rick Adams has sent us a text file describing graphics commands for Level II BASIC. **Kevin Darling** (KDARLING) has sent us a description of OS-9 Level II window codes and also a file that tells folks how to extract the Level II kernel from the just-released game *Rogue*. (This is for folks who wanted advance access to OS-9 Level II.) **Jay Truesdale** (JAYTRUESDALE) has sent us a fascinating announcement from Atari about two interesting new products.

In the Applications section of OS-9 Online, **Bill Brady** (WBRADY) has sent us a BASIC09 program to calculate sunrise and sunset times, a driver for the Radio Shack CGP-115 graph plotter, and a simple database program. In the Utilities section, **Peter E. Durham** (PEDXING) has sent us a program for modifying various option allows you to page another user to the Conference area.

`NAME` — This option allows you to change your name while in Conference. It doesn't change your username, but changes the way other users see your name. Most people choose to change to their first names. Others have special online nicknames they favor.

`EXIT` — As with all areas of Delphi, you can leave the Conference area by entering `EXIT` or pressing CONTROL-Z.

This is the basic Conference menu. It is available immediately upon entering the Conference area. Once you have joined a group, however, a more powerful set of commands and options becomes available to you. Some special commands, which will be covered in a future issue, are only available to the group leader. As stated above, the group leader is the person who created the group in the first place. If that person should leave the group for any length of time, he will lose his group leader status, and the second person who originally entered the group will take over. Following is a list of the immediate commands available while in a conference group. To see the list online, just enter `/HELP`. Notice that all commands must be prefaced with a slash (/). If they are not, the Conference software will just send them to all other members of the group, thinking it is text.

`/ANSWER` — Issue this command when you want to accept a page from someone in another group.

`/BUSY` — Use this command to disable `/SEND`s from users outside your conference group. You can "ungag" yourself by typing `/NOBUSY`.

`/BYE` — This command causes a complete logoff from Delphi.

`/CANCEL` — This command cancels all pages you have issued that are still pending or unanswered.

`/EXIT` — Use this or CONTROL-Z to exit the group and return to the Conference menu.

`/GNAME` *name* — This command allows any member of the conference group to change the name of the group.

`/HELP` — Causes this list, without definitions, to be displayed to your screen.

`/JOIN` *groupname* — This command allows you to become a member of a different group, thereby leaving the one you are presently in. You can also use `/JOIN` *groupnumber.*

`/MAIL` — By issuing this command, you temporarily leave Conference and enter your Mail area. However, anyone who joins your group will think you are still there. They will see your name as being a group member. Because of this, it might be wise to use `/NAME` to change your name to something like IN MAIL or BE RIGHT BACK.

`/NAME` *nickname* — Allows you to change your visible name from your username to a nickname. The change is not permanent and will not remain in effect after you leave the Conference area. Similarly, anyone not in the Conference area will see your normal username if they do a `WHO`.

`/PAGE` *username* — You can page any other user in the CoCo SIG to your Conference group by issuing this command with their username. The only exception is that they won't receive the page if they are presently gagged, or busy. Rather, you will get a message telling you they are not available.

`/REJECT` — Allows you to reject a `/PAGE` from another user. If you send this command, the other user will receive a message telling him you do not want to talk with him.

`/REPEAT` — Causes all text you send to other group members to be repeated back to your terminal as you sent it. You can turn this off by typing `/NOREPEAT`.

`/RNAME` *nickname* — If you want to know which nickname corresponds to which username, issue this command followed by the nickname in question.

`/SEND` *name-list message* — This command allows you to send a semi-private message to those usernames listed in the name list. These usernames must be separated by commas if you use more than one. A message sent this way will be seen only by those people listed in *name-list*. It will not be seen by any other members of the Conference group. This is a great way to "talk behind someone's back," but be careful.

---

keyboard server defaults for Level I, Version 1 and Version 2. **Roger Smith** (SMUDGER) has provided `UNLOAD.09`, a procedure to unlink modules until they disappear from memory.

In the Device Driver topic area, **Toni Ryan** (TNTRHODAN) has provided source code for a disk driver, allowing you to change stepping rates and number of heads and tracks. **Michael Dziedzic** (MJD) has uploaded various 80-column screen drivers for OS-9 Level I, including a particularly sharp 25-line driver. **Vincent Figundio** (VINFIG) has sent us a RAM disk driver for OS-9 Level I on the CoCo 3.

In the Telecommunications area, Bill Brady has been quite busy, uploading five new groups that comprise his *BigT* telecommunications package. These include `BIGT`, an Xmodem terminal program that allows auto-logs and baud rate changes, `SIO` and `SIO2.ASM` (source code for ACIA pack drivers for `BIGT` for Level I and Level II OS-9), `NUHOST` (source code for his auto-log files), and `NUHOST.I` (object modules to create the auto-log files for `BIGT`).

Lastly, in the Patches topic area, our own **Don Hutchison** (DONHUTCHISON) has given us *Fast Boot*, a utility that allows you to patch the boot file for OS-9 Level I, Version 2, to allow faster booting by utilizing 6-ms step rates during the boot process.

New in the CoCo SIG Database

In the General topic area, **Mike Fischer** (MIKE88) uploaded a discussion from a local BBS about the CoCo 3 versus the IBM PC (with a few misunderstandings about the significance of clock speeds).

In the Data Communications section, in addition to Rick Adams' debut of *Rickyterm*, we also have received a dialer program for *MikeyTerm*, from **Ron Bihler** (RAAB) and several Ham radio programs (including an RTTY program) from Rainbow's **Dan Downard** (DANDOWNARD). Of course, readers should note that, as of last month, we have online the latest revision of *MikeyTerm* (Version 4.3) by **Mike Ward** (MIKEWARD) that supports the CoCo 3 in 80-column mode. Mike Ward, a SysOp on CompuServe, visits Delphi's CoCo SIG almost daily and is available to answer questions about *MikeyTerm*.

Our Graphics database has been bursting with new files. **Jim Stewart** (WHEELJIMMER) has sent us a stunning CoCo 3 picture of a Unicorn (which he noted was drawn entirely using mouth control due to his disablity). **Emery Mandel** (EMANDEL) has sent us a Pink Floyd logo and a peace symbol for the CoCo 3. Mike Fischer has sent a revised driver for his bouncing ball demo program, now allowing for a rainbow-colored ball. **John Snyder** (MYTHRANDIR) has provided an updated and improved version of his `Hcopy` utility for converting graphics screens. **Pat Leathrum** (LEATHRUMRA) has given us a picture of the *Eagle Lunar Lander*. **Richard Trasborg** (TRAS) has sent a number of images of women.

I uploaded some alternate software fonts for the CoCo 3 under the `HPRINT` command, including a 128-character set that provides for letters in the same fonts used by the IBM PC color graphics adapter. **Raymond Lueders** (MOONSHINE) has also given us some female

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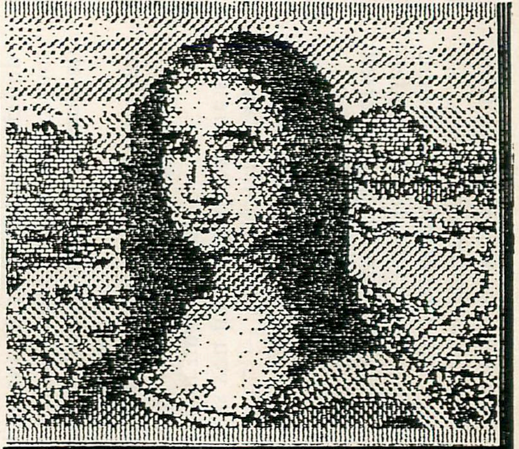

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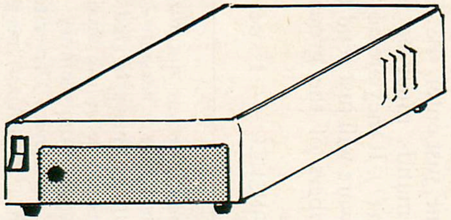

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If you forget the slash, or if it isn't the first character on a new line, all group members will see the message.

/SQUELCH *name* — This command allows you to "block out" another user. Anything he sends you with /SEND or anything he says in Conference will not be sent to your terminal. To be polite, only use this if someone is really bugging you. It might be more polite to simply leave the group.

/TALK *groupnumber* — This command allows you to temporarily talk to another conference group without leaving the group you are presently in. You may use this any number of times to become a semimember of any number of groups. You will be "listening" to any groups you pick, but you must use /TALK *groupnumber* to talk back. You can only talk to one group at any one time. You can leave a group that you joined with /TALK by using CONTROL-Z, /EXIT or /JOIN. You must use the group number for this command. As an example, if you want to listen and talk with group number 3 without leaving your present group, just type /TALK 3 and press ENTER.

/TIME — When you issue this command, you will see what time of day it is (handy for long conferences), as well as how long you have been logged onto Delphi.

/WHO — This command shows who is in Conference and in which groups. Each group listing has a unique group number. Use this number for /TALK. You will also see the usernames of all people currently in the CoCo SIG.

/WHOIS *username* — This allows you to get the Delphi user profile for the indicated username. This assumes the user has entered a profile at the People on Delphi option of the main Delphi menu.

More information can be found for these and other commands by typing /HELP */subject* while in Conference where *subject* is the command you want more information about.

User Profiles Needed

It has been pointed out that many users, especially newcomers to the SIG, have not yet posted their personal profiles. It is important that other members be able to find out a little information about you. It is especially useful to have this information when talking in Conference with other users. It lets you get a little background information on the people with whom you are communicating. All that is necessary is that you answer a few simple questions about yourself. First, at the CoCo SIG prompt, enter MEMBER to get to the membership directory. Then type I-AM and answer the prompts. Now, this profile is not the one used when someone types /WHOIS in Conference. You need to go to the Main Delphi menu and enter PEOPLE. Then, again, type I-AM and answer the prompts. These simple procedures take no more than a few minutes and will enhance the friendly atmosphere on the SIG. While you are in these member directories giving your user profile, you might also enter WHOIS MARTYGOODMAN. I think you will find out quite a bit about this knowledgeable CoCo personality.

Are you one of the many who would like a "cleaner" way to hang up on Telenet? Well, in addition to simply typing HANG at the Telenet @ prompt after you log off Delphi, you can configure your pad setup to automatically hang up on Telenet when you log off Delphi. At the SIG > prompt, simply type:

```
/PADSETUP 0:0,32:1      ENTER
/SAVE                   ENTER
```

Having done that, the new pad setup for you will be saved as the default and from then on, until you change it, you will get an automatic hangup on Telenet. There is no similar setup to cover Tymnet, as far as we know. If you want to "undo" the pad setup, use:

```
/NOPADSETUP             ENTER
/SAVE                   ENTER
```

Note: Do not play with these commands if you are direct-dialed (not using Telenet or Tymnet.)

Hope this is helpful to you. □

---

images, and some cartoons as well. **Bob Wharton** (BOBWHARTON) uploaded several nice CoCo 3 pictures (including *Opus of Deathtongue* and a set of NCAA college logos), and **James Kenney** (KENNEY) sent us his HDISPLAY utility.

Bob Montowski (GRAPHICSPUB) sent us a utility for viewing 16-level DS-69 pictures on a CoCo 3. I should note that Microworks, the maker of the DS-69, has just released a B version of this unit that works on the CoCo 3 and, in the official driver software, supports display of 16 gray-level pictures on the CoCo 3. **Loren Howell** (XENOS) has sent us his BASIC drawing program, *Hdoodle*, for the CoCo 3. In the Music topic area **Jonathan Griffin** (JAG) has sent us his *Sleigh Ride* composition.

In the Games database, **David Ferreira** (SKEEVE) has provided a *Star Trek* game for the CoCo 3. **Jim Thompson** (BLUDGEON) has sent two new games, including a *Game of Life* program. **Ed Niklas** (RAINMAKER) has sent us an Adventure game, and **Martyn Phillips** (NORABDER) has uploaded *Starlanes*. **Steve Macri** (DRACMAN) has sent us a *Chawks* football game for the CoCo 3, and our own Cray Augsburg and Don Hutchison have sent us a number of new games, including the *Realm of Nauga* and a *Motorcycle Jump* game.

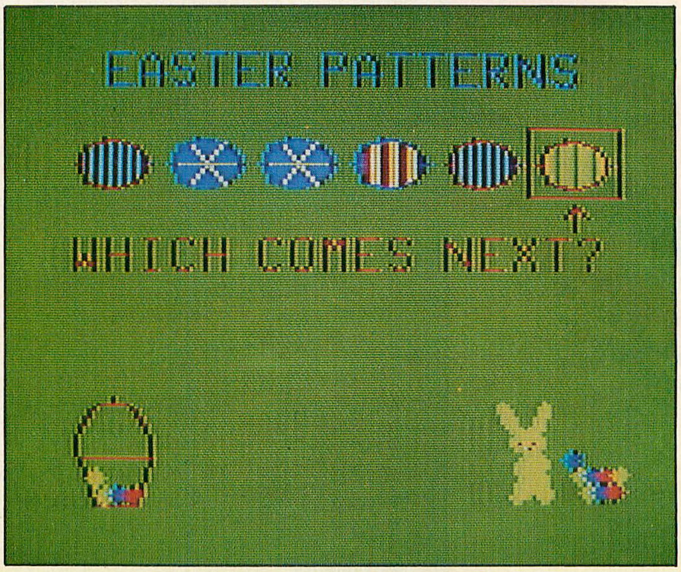
In the Hardware Hacking section, I have uploaded instructions on how to hook a CoCo 3 RGB port to a Sony XBR or Profeel-type monitor. **Dennis Skala** (DENNYSKALA) has sent information on modifying a PBJ CC bus for the CoCo 3.

In the Utilites and Applications section, **Art Flexser** (ARTFLEXSER) has provided a program to allow viewing of all possible foreground, background, and border color sets on an 80- or 40-column text screen. This utility is part of Art's newly released ADOS3 package of DOS enhancements for CoCo 3 systems. **Roger Hallman** (ROGERH) sent a Ram disk for the CoCo 3. **Roger Krupski** (HARDWAREHACK) has sent a 512K memory tester, also for the CoCo 3. **Ken Schunk** (KENSCHUNK) sent what I understand is a definitive patch for *CoCo Max* software to allow it to run on a CoCo 3 (but only using old PAL chips or a Y cable). Don Hutchison has sent us a 35- to 40-track patch program, a disk editor, and a disk aid utility. **Leonard Litberg** (RADICAL) has sent us a CoCo 3 screen utility. **Derrick Kardos** (DTG) has sent us a public domain word processor. **Dave MacLeod** (SCORPION2) has sent us *Bacpac* Version 2.0.

In the Source Code for 6809 section, Don Hutchison has sent us an RS-232 bit banger SEND routine. **Alan DeKok** (ALANDEKOK) has sent NEWATTR.ASM, a utility for manipulating CoCo 3 text attributes. Jim Thompson has sent us the source code for his *Onedee* game and for a *Game of Life*. In the CoCo 3 News and Information area, Art Flexser has sent us a file about the "reset bug" in the CoCo 3, Alan Dekok has sent us a program to extract the CONTROL-ALT-RESET picture of the three Microware Mugs, and Richard Trasborg and **Jim Shoop** (BAZAR) have sent us various sorts of patches for *CoCo Max*.

— Marty Goodman
Rainbow's Delphi Database Manager

Hippity Hoppity Down the Bunny Trail!



By Laura and Chris Petit

Children in our school enjoy coming to computer lab each week. However, holidays are especially awaited by the children. For this reason, my husband and I wrote *Easter Patterns*. Not only is the game enjoyable but it is educational as well.

Easter Patterns includes the Easter bunny, Easter eggs and Easter music. The children are drilled in selecting patterns. Several eggs are displayed and the child must decipher the pattern and chose which egg is next. Each time the correct egg is chosen, the bunny hops across the screen and places an egg in the basket. If the wrong egg is chosen for the pattern, the child is asked to try again. When the child answers correctly three consecutive times, the difficulty of the pattern increases. If he cannot answer correctly more often than incorrectly, the program automatically defaults to the easier level. With 10 correct answers, the bunny completely fills the basket and hops away, basket and all, to the tune of "Here Comes Peter Cottontail."

Easter Patterns provides the child with an interesting problem and quick rewards.

(Questions about this program may be directed to the Petits at 135 Davis Drive, Luling, LA 70070. Please enclose an SASE for a reply.) ☐

Laura Petit holds a master's degree in curriculum and instruction, and is the computer coordinator at Our Lady of Prompt Succor School in Westwego, Louisiana. Chris is a self-taught computer programmer. Together, they enjoy writing programs for the school's computer lab.

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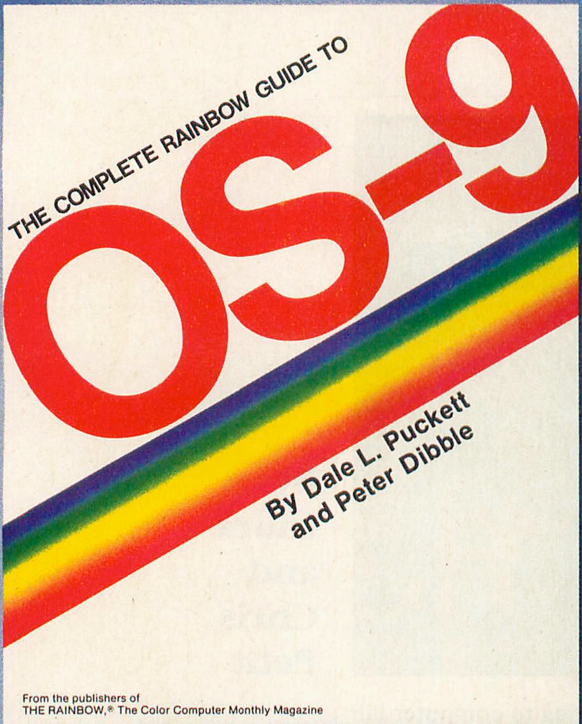
THE COMPLETE RAINBOW GUIDE TO OS-9


THE COMPLETE RAINBOW GUIDE TO
OS-9
By Dale L. Puckett and Peter Dibble
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13	142	101	95
29	195	109	100
48	209	124	198
60	112	143	41
76	179	END	3
86	41		

The listing: EASTER

```
1 DIM A$(28),N$(10),C(7),E0(16),
E1(16),E2(16),E3(16),E4(16),E5(1
6),E6(16),E7(16),R1(40),R0(35),E
X(11),EY(11),CC(11)
2 RESTORE:FOR I=0 TO 28:READ A$(
I):NEXT:FOR I=1 TO 9:READ N$(I):
NEXT
3 PMODE3,1:PCLS:SCREEN1,0
4 COLOR4:CIRCLE(56,129),40,,1.2:
CIRCLE(56,129),2,,.9:CIRCLE(56,1
45),20,,.3,0,.5
5 LINE(72,123)-(112,105),PSET:LI
NE(72,129)-(112,129),PSET:LINE(7
2,135)-(112,153),PSET
6 LINE(40,123)-(0,105),PSET:LINE
(40,129)-(0,129),PSET:LINE(40,13
5)-(0,153),PSET
7 CIRCLE(30,54),20,,2,.25,.20:CI
RCLE(78,54),20,,2,.35,.23
8 PAINT(34,90),2,4:PAINT(79,89),
2,4:PAINT(56,90),2,4
9 CIRCLE(40,111),4,3,.9:CIRCLE(7
2,111),4,3,.9
10 'write title screen
11 A$="EASTER":DRAW"BM120,70C4S1
2":GOSUB20
12 A$="PATTERNS":DRAW"BM93,103":
GOSUB20
13 A$="BY":DRAW"BM170,140S8C3":G
OSUB20
14 A$="CHRIS AND":DRAW"BM125,160
":GOSUB20
15 A$="LAURA PETIT":DRAW"BM110,1
80":GOSUB20
16 'music--thanks paula & james
17 PLAY"L4T3O3EGP64GAECP64L2CL4A
P64O4CP64CDO3AL8FP64L2FL16GP16GP
16L4GP32L16GP16GP16L4GP32BAFAL2G
"
18 FORDE=1TO400:NEXTDE:GOTO112
19 'subroutine to write to scr
20 L=LEN(A$):FOR I1=1 TO L:C=ASC
(MID$(A$,I1,1))-65:IF C=-33 THEN
 DRAW"BR5":NEXT I1 ELSE IF C<0 T
HEN C=C+47
21 IF C=45 THEN C=26
22 DRAW A$(C):NEXTI1:RETURN
23 PCLS:NR=0
24 FOR I=0 TO 7:READ EX(I),EY(I)
,C(I)
25 'draw eggs
26 CIRCLE(EX(I),EY(I)),13,C(I),.
9,.25,.75:CIRCLE(EX(I),EY(I)),20
,C(I),.5,.75,.25
27 NEXT I
28 PAINT(20,20),C(0),C(0)
29 PAINT(80,25),C(1),C(1):COLOR
C(1)-1:DRAW"BM80,25;S4;BU4L8R24B
D4R2L27BD4R25"
30 PAINT(144,25),C(2),C(2):COLOR
 C(2)-1:DRAW"BM144,25;NL12NR16U5
NU4NL9NR12D10ND4NL9NR12BR6D4U16B
L12D16"
31 POKE 178,104:PAINT(200,25),,C
(3)
32 COLOR C(4):PAINT(25,60),,C(4)
:COLOR C(4)-1:DRAW"BM25,60;NE8NF
8NG7NH7NL12NR11"
33 POKE 178,225:PAINT(85,60),,C(
5)
34 POKE 178,250:PAINT(145,60),,C
(6)
35 POKE 178,13:PAINT(200,60),,C(
7)
36 'store the eggs in arrays
37 'each egg array 32x19
38 GET (8,15)-(40,34),E0,G
39 GET (68,15)-(100,34),E1,G
40 GET (128,15)-(160,34),E2,G
41 GET (188,15)-(220,34),E3,G
42 GET (8,50)-(40,69),E4,G
43 GET (68,50)-(100,69),E5,G
44 GET (128,50)-(160,69),E6,G
45 GET (188,50)-(220,69),E7,G
46 'draw rabbits on screen
47 PCLS:DRAW"BM160,180;C2L4E3R3U
1H3L7H2U2E2R2E1R2H10E3F12U10E3F3
D10R2U1R2U1R12F2R1F2R1F2D1G6L6F4
L14E3M162,180"
48 PAINT(160,168),2,2:PSET(154,1
68,3):PSET(154,167,3):PSET(149,1
69,3)
49 'store rabbit in array R1
50 GET (145,153)-(199,180),R1,G
51 PCLS:DRAW"BM194,180;C2G2L2H2E
3U3E1U1E1U2G1L1U1H1U1E4H2L1H2U2E
2R1E2R3F2R2F2D2G3F4D2G2F2D4F2D2G
2L2H4G2"
52 DRAW"BM192,153;C2H2U2H2U2H3G2
D2F2D2F4;BM196,153;E2U2E2U2E3F2D
4G2D3G2D2"
53 PAINT(200,150),2,2:PAINT(187,
149),2,2:PAINT(194,158),2,2:PSET
(193,158,4):PSET(198,158,4):PSET
(196,160,3)
```

```
54 GET(180,140)-(211,183),R0,G
55 FOR I=0 TO 11:READ EX(I),EY(I
),CC(I):CIRCLE(EX(I)+210,EY(I)),
5,CC(I):PAINT(EX(I)+210,EY(I)),C
C(I),CC(I):NEXT
56 'draw basket
57 DRAW"BM26,182;C4L18M3,163R30M
26,182":CIRCLE(16,162),18,4,1.3,
.5,.99
58 A$="EASTER PATTERNS":DRAW"BM1
5,20;C3;S8":GOSUB20
59 A$="WHICH COMES NEXT?":DRAW"B
M0,90C4":GOSUB20
60 GOTO 116
61 'put eggs on screen
62 X=X+40:ON E GOTO 63,64,65,66,
67,68,69,70
63 PUT(X,Y)-(X+32,Y+19),E0,PSET:
RETURN
64 PUT(X,Y)-(X+32,Y+19),E1,PSET:
RETURN
65 PUT(X,Y)-(X+32,Y+19),E2,PSET:
RETURN
66 PUT(X,Y)-(X+32,Y+19),E3,PSET:
RETURN
67 PUT(X,Y)-(X+32,Y+19),E4,PSET:
RETURN
68 PUT(X,Y)-(X+32,Y+19),E5,PSET:
RETURN
69 PUT(X,Y)-(X+32,Y+19),E6,PSET:
RETURN
70 PUT(X,Y)-(X+32,Y+19),E7,PSET:
RETURN
71 'egg pattern chosen here
   E1 holds the correct answer
72 SCREEN1,0:LL=0:Y=40:X=-40:C=R
ND(5):ON C GOTO 73,74,75,76,77
73 E=RND(6)+1:GOSUB62:GOSUB62:E=
E+1:GOSUB62:E=E-1:GOSUB62:E1=E:G
OTO85
74 E=RND(6)+1:GOSUB62:E=E+1:GOSU
B62:GOSUB62:E=E-1:GOSUB62:E1=E+1
:GOTO85
75 E=RND(6)+1:GOSUB62:E=E+1:GOSU
B62:E=E-1:GOSUB62:E=E+1:GOSUB62:
E1=E-1:GOTO85
76 E=RND(4)+2:GOSUB62:E=E+1:GOSU
B62:E=E+1:GOSUB62:E=E-2:GOSUB62:
E1=E+1:GOTO85
77 E=RND(8):GOSUB62:GOSUB62:GOSU
B62:GOSUB62:E1=E:GOTO85
78 LL=1:X=-40:C=RND(6):ON C GOTO
 79,80,81,82,83,84
79 E=RND(5):GOSUB62:E=E+1:GOSUB6
2:E=E+1:GOSUB62:E=E+1:GOSUB62:E=
E-3:GOSUB62:E1=E+1:GOTO85
80 E=RND(6):GOSUB62:E=E+1:GOSUB6
2:E=E+1:GOSUB62:GOSUB62:E=E-1:GO
SUB62:E1=E-1:GOTO85
81 E=RND(6):GOSUB62:GOSUB62:E=E+
1:GOSUB62:GOSUB62:E=E+1:GOSUB62:
E1=E:GOTO85
82 E=RND(6):GOSUB62:E=E+1:GOSUB6
2:GOSUB62:E=E+1:GOSUB62:E=E-2:GO
SUB62:E1=E+1:GOTO85
83 E=RND(7):GOSUB62:E=E+1:GOSUB6
2:GOSUB62:GOSUB62:E=E-1:GOSUB62:
E1=E+1:GOTO85
84 E=RND(7):GOSUB62:GOSUB62:E=E+
1:GOSUB62:E=E-1:GOSUB62:GOSUB62:
E1=E+1:GOTO85
85 E=RND(8):GOSUB62
86 IF LL=0 THEN DRAW"BM177,75;C4
S4U10NF5G5"
87 IF LL=1 THEN DRAW"BM217,75;C4
S4U10NF5G5"
88 COLOR 4:LINE(X-4,Y-4)-(X+36,Y
+22),PSET,B
89 B$=INKEY$:IF B$=CHR$(32) THEN
 90 ELSE IF B$=CHR$(13) THEN 92
ELSE 89
90 X=X-40:E=E+1:IF E=9 THEN E=1
91 GOSUB 62:GOTO89
92 IF E1=E THEN 94 ELSE 109
93 'right answer
94 COLOR1:LINE(180,140)-(211,183
),PSET,BF:NN=ABS(NR-11):NX=EX(NN
)+210:CIRCLE(NX,EY(NN)),5,CC(NN)
+1:PAINT(NX,EY(NN)),1,CC(NN)+1:C
IRCLE(NX,EY(NN)),5,1
95 FOR I=150 TO 35 STEP -23:PUT(
I,155)-(I+54,182),R1,PSET:SOUND1
47,2:LINE(I,155)-(I+54,182),PSET
,BF:NEXT:LINE(35,155)-(89,182),P
SET,BF
96 IF NR=11 THEN 104
97 PUT(35,140)-(66,183),R0,PSET
98 CIRCLE(EX(NR),EY(NR)),5,CC(NR
):PAINT(EX(NR),EY(NR)),CC(NR),CC
(NR):SOUND100,2:NR=NR+1:IF NL<5
THEN NL=NL+1
99 FOR DE=1 TO 500:NEXT DE
100 COLOR1:LINE(35,140)-(66,183)
,PSET,BF:PUT(180,140)-(211,183),
R0,PSET
101 IF NL<3 THEN 72 ELSE IF LL=0
 THEN COLOR1:LINE(X-4,Y-4)-(X+40
,Y+36),PSET,BF
102 IF LL=0 THEN NL=5:GOTO78 ELS
E 78
103 'move rabbit off screen
104 COLOR1:LINE(0,138)-(40,184),
PSET,BF:PUT(I,155)-(I+54,182),R1
,PSET:GET(I+27,155)-(I+54,182),R
1,G:SOUND147,3:LINE(I,155)-(I+54
,182),PSET,BF:PUT(0,155)-(27,182
```

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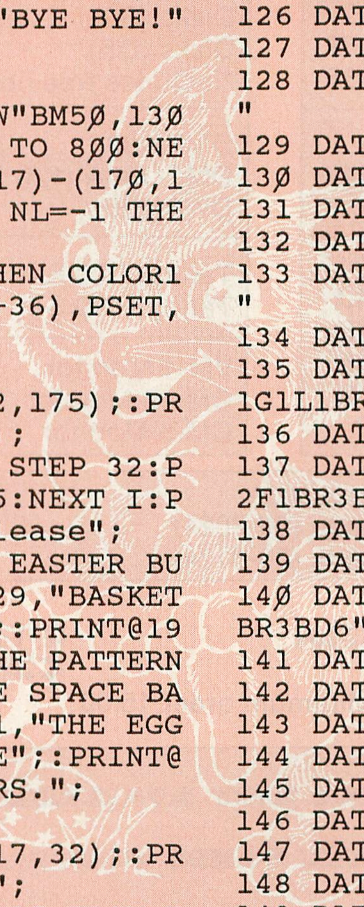

```
),R1,PSET:SOUND147,3:LINE(0,154)
-(28,184),PSET,BF
105 PLAY"L4T3O3EGP64GAECP64L2CL4
AP64O4CP64CDO3AL8FP64L2FL16GP16G
P16L4GP32L16GP16GP16L4GP32BAFAL2
G"
106 A$="PLAY AGAIN?":DRAW"BM42,1
30C3S8":GOSUB20
107 A$=INKEY$:IFA$=""THEN 107 EL
SE IF A$="Y" THEN 2 ELSE IF A$="
N" THEN CLS:PRINT@252,"BYE BYE!"
:END ELSE 107
108 'wrong answer
109 A$="TRY AGAIN":DRAW"BM50,130
C4S8":GOSUB20:FOR DE=1 TO 800:NE
XT DE:COLOR1:LINE(49,117)-(170,1
31),PSET,BF:NL=NL-1:IF NL=-1 THE
N NL=0
110 IF NL<3 AND LL=1 THEN COLOR1
:LINE(X-4,Y-4)-(X+40,Y+36),PSET,
BF:NL=0:GOTO72
111 GOTO89
112 CLS:PRINTSTRING$(32,175);:PR
INT@480,STRING$(31,175);
113 FOR I=1056 TO 1535 STEP 32:P
OKE I,175:POKE I+31,175:NEXT I:P
RINT@455,"one moment please";
114 PRINT@65,"HELP THE EASTER BU
NNY FILL HIS";:PRINT@129,"BASKET
 BY TELLING HIM WHICH";:PRINT@19
3,"EGG COMES NEXT IN THE PATTERN
.";:PRINT@257,"PUSH THE SPACE BA
R TO SELECT";:PRINT@321,"THE EGG
.  PRESS enter WHEN THE";:PRINT@
390,"CORRECT EGG APPEARS.";
115 GOTO23
116 PRINT@455,STRING$(17,32);:PR
INT@457,"press any key";
117 IF INKEY$="" THEN 117 ELSE 7
2
118 'data for letters scale=8
     or higher, even #s only
119 DATA "U4E2F2D2NL4D2BR3"
120 DATA "U6R3F1D1G1NL3F1D1G1L3B
R7"
121 DATA "BR1H1U4E1R2F1BD4G1L2BR
6"
122 DATA "U6R3F1D4G1L3BR7"
123 DATA "NR4U3NR2U3R4BR3BD6"
124 DATA "U3NR2U3R4BR3BD6"
125 DATA "BR1H1U4E1R2F1BD2NL1D2G
1L2BR6"
126 DATA "U3NU3R4NU3D3BR3"
127 DATA "BR1R1NR1U6NL1R1BR4BD6"
128 DATA "BU1F1R1E1U5NL1R1BR3BD6
"
129 DATA "U3NU3R1NE3F3BR3"
130 DATA "NU6R4U1BR3BD1"
131 DATA "U6F2E2D6BR3"
132 DATA "U6;M+5,+6;NU6BR3"
133 DATA "BR1H1U4E1R2F1D4G1L2BR6
"
134 DATA "U6R3F1D1G1L3BR7BD3"
135 DATA "BR1H1U4E1R2F1D3G1NH1NF
1G1L1BR6"
136 DATA "U6R3F1D1G1L2NL1F3BR3"
137 DATA "BU1F1R2E1U1H1L2H1U1E1R
2F1BR3BD5"
138 DATA "BR2U6NL2R2BR3BD6"
139 DATA "BU1NU5F1R2E1U5BR3BD6"
140 DATA "BU6D2F1D1F1ND1E1U1E1U2
BR3BD6"
141 DATA "NU6E2NU1F2U6BR3BD6"
142 DATA "U1E4U1BL4D1F4D1BR3"
143 DATA "BU6D2F2ND2E2U2BR3BD6"
144 DATA "NR4U1E4U1L4BR7BD6"
145 DATA "BU5E1R2F1D1G2BD1D1BR5"
146 DATA "BR1BU5E1BR4BD6"
147 DATA "BU3R4BR3BD3"
148 DATA "BL1BD2R1NR1U6G1"
149 DATA "BD1BL2NR4U1E1R1E2U1H1L
2G1"
150 DATA "BL2BD1F1R2E1H2E2H1L3"
151 DATA "BR1BD2U2NR1L3U1E3D4"
152 DATA "BD1BL2F1R2E1U2H1L3U2R4
"
153 DATA "BR2BU3H1L2G1D4F1R2E1U1
H1L3"
154 DATA "BL2BD2U1E4U1L4"
155 DATA "BL1BD2H1U1E1H1U1E1R2F1
D1G1NL2F1D1G1L2"
156 DATA "BD1BL2F1R2E1U4H1L2G1D1
F1R3"
157 DATA 20,25,0,80,25,2,140,25,
3,200,25,4,20,60,3,80,60,3,140,6
0,2,200,60,0
158 DATA 12,178,2,18,178,3,24,17
8,4,9,171,2,15,171,3,21,171,4,26
,171,2,6,165,3,12,165,4,18,165,2
,24,165,3,30,165,4
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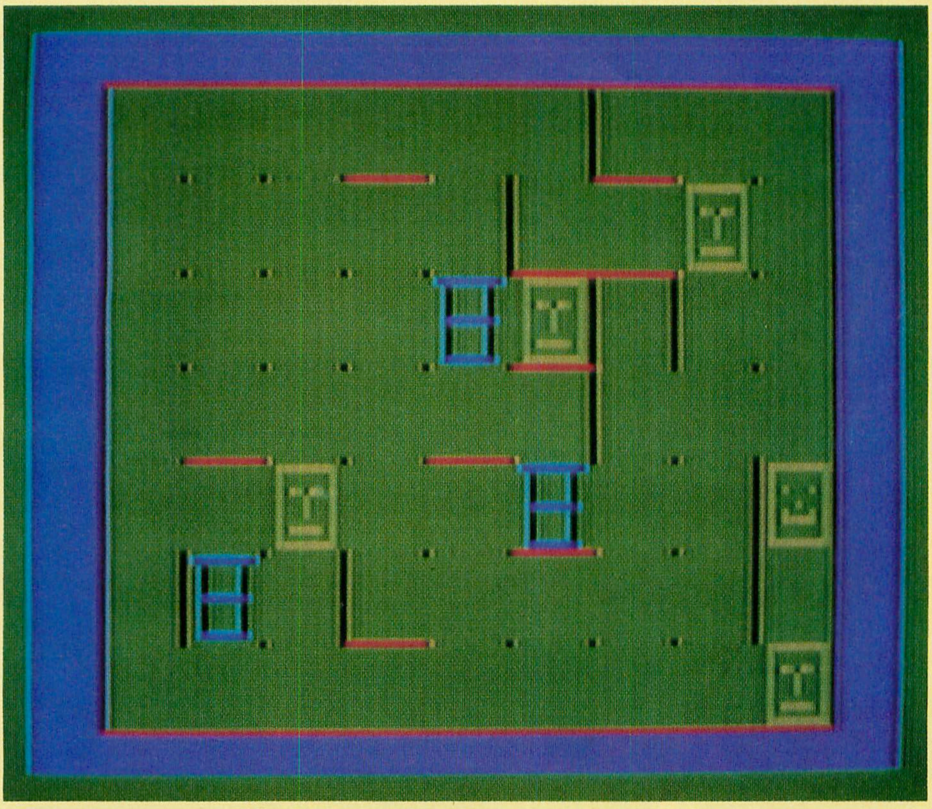
Woe be unto those he captures — he doesn't take prisoners

Battlin' Blue Bert

By James A. Noble



Bert *hates* barriers. Religious, social, racial, economic, political . . . it doesn't matter. Bert hates them all. Give him half a chance and he'll try to win over the Intolerants with his winning smile and cool logic. But throw a barrier in his way and look out. Bert gets mean, real mean. He'll leap into a nearby phone booth and emerge as Battling Blue Bert, Barrier Buster.

Barriers shatter before him as he races after the bigotted and the narrow-minded within his range. Woe be unto those he catches. Battling Blue doesn't take prisoners.

The only hope the Intolerants have is that Battling Blue will calm down and become his old, smiling, friendly self before he reaches them, and that they can create enough barriers to prevent him from reaching another phone booth.

The Intolerants are tricky. They look very much like Bert himself (except they don't smile). Often they hide behind the phone booths, or even each other, hoping the Barrier Busters won't find them. Sometimes they'll even stand in front of a phone booth so he can't see it to transform himself into Battling Blue.

Ultimately, the goal of Bert is to break the confines of all prejudice once he has eliminated its supporters.

Game Strategy

Barrier Buster is an action game which will fascinate both children and adults for many hours. The game is designed with extensive usage of the random number generator function call (RND) to set up the playing area, thus it is highly unlikely that the player will ever play exactly the same game twice.

The object of the game is simple. Bert, the smiling, blinking figure, must overcome the four Intolerants by occupying their positions. Once he has captured all four of them, he must break through one of the walls making up the playing area.

Random barriers form during the course of play which Bert cannot break through in his normal form. In order to get to the Intolerants behind these barriers and in order to break through one of the walls of the playing area when he has captured them all, he must enter one of the four phone booths (by occupying its space) and be changed into Battling Blue Bert, capable of breaking through the barriers. Unfortunately for Bert, this transformation does not last for more than about seven seconds.

Sometimes the Intolerants hide behind each other (two or three deep occasionally) or behind a phone booth. Many times they stand in front of a phone booth so the player can't see it (although if Bert captures the Intolerant, he also feels the effect of the phone booth).

The game is designed for a CoCo with Extended BASIC. One joystick connected to the right joystick port is required.

Once you've entered the program, simply type RUN to begin the game. A title page appears, then after a few seconds, the playing area, Bert, four Intolerants and four phone booths

---

James Noble is a graphics programmer for the U.S. Navy. His work has received spots on national and public television as well as write-ups in several local papers and Defense Department periodicals. He holds a bachelor's degree in electronic engineering and has published nearly two dozen short stories, mysteries and articles.

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The show begins Friday evening with the exhibit hall open from 7 p.m. to 10 p.m. Saturday's action is nonstop beginning with the 8 a.m. CoCo Community Breakfast (separate tickets required). Our featured speaker is Greg Zumwalt, president of ZCT software. Exhibits and seminars will be in full swing from 10 a.m. to 6 p.m., and from 11 a.m. to 4 p.m. on Sunday. That will be hardly enough time to see and do everything you'll want to, between scheduled events and our new Educational Sandbox for the kids — plus a special appearance by CoCo Cat, too!

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Show Schedule:

Friday evening
- Exhibits open from 7 p.m. to 10 p.m.

Saturday
- CoCo Community Breakfast at 8 a.m.
- Exhibits open at 10 a.m. and close at 6 p.m.

Sunday
- Exhibits open from 11 a.m. to 4 p.m.

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CoCo Community Breakfast

Greg Zumwalt — CoCo 3 Programmer

Our keynote speaker for the traditional CoCo Community Breakfast is Greg Zumwalt, one of the early CoCo specialists who has created everything from flight simulators to computer games. An independent programmer and computer designer, Greg is one of the few people Tandy has selected to write software for the new Color Computer 3. He owns ZCT Software, of Tulsa, Okla., and also writes software for business applications in such areas as aviation, the oil industry and the medical field.

▲ SPECIAL EVENT!

We are pleased to announce The Educational Sandbox, a joint Tandy/RAINBOW effort. This is a computer workshop for RAINBOWfest kids. There will be two sessions on both Saturday and Sunday. One workshop will be for the kindergarten through third-grade set, and the other for fourth through seventh graders. Each workshop will last between 45 minutes and one hour, and will give the children and their parents hands-on experience in using Tandy computers and software.

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appear. If any of the figures fail to appear, it means that one or more of the Intolerants or phone booths is hidden or has been captured immediately (hiding behind Bert). Check for small yellow markers along the left border. A marker will appear each time an Intolerant is overcome.

Using the joystick, maneuver Bert (the smiling yellow figure) between the points marking the rows and columns of the playing area and around the red barriers which are forming, and overcome the Intolerants (the yellow frowners) by positioning him over their locations on the playing area. Be certain you cover each Intolerant completely. Leave any piece behind and you won't score a capture.

Should Bert or an Intolerant become trapped behind the forming barriers, move Bert to a phone booth and he will be transformed. For the next seven seconds, Blue Bert may crash through the barriers to reach the Intolerant, but be careful. The barriers can reform themselves and can trap Bert after he has returned to his smiling, mild-mannered self.

Once you have captured all four Intolerants, you must penetrate the outer wall of the playing area in order to win the game. This can only be accomplished if you have captured all four Intolerants and are Battling Blue Bert (so keep a phone booth in reserve to break through the playing area).

Should Bert become hopelessly surrounded, press BREAK to end the game. Type RUN to play again.

Count your phone booths and Intolerants when the game begins. There should be four of each. If not, look for the markers on the left edge. They will indicate whether one or more of the Intolerants was captured immediately because it occupied the same row and column position as Bert. If that is not the case, one or more of the Intolerants is hidden and that will affect your play. Unless you score more than one capture when you pick up all the visible Intolerants, you will have to go around searching the phone booths to pick up the hidden ones.

If Bert appears at the beginning of the game as Battling Blue, it indicates one of the phone booths occupied Bert's position. If not, it means that a phone booth is hidden behind another or that it's behind an Intolerant. This will effect your play also.

Go for the Intolerants early in the game while there are few barriers. You won't get the chance later on when you will need a phone booth for just about every action you make.

Given a choice, stay close to the outer wall. The probability of a random barrier appearing along the outer wall is half that of barriers appearing anywhere else.

"Go for the Intolerants early in the game while there are few barriers. You won't get the chance later on when you will need a phone booth for just about every action you make."

The Program

The first four lines of the program provide a title page for the user to look at while the variables are being initialized and graphics figures are being created (lines 50 through 450). The playing field and figures are revealed by the SCREEN command on Line 460. Lines 470 through 670 mark the main iterative loop for the action which takes place.

First, the position of Bert on the playing field (XM and YM) is compared with the position of each of the four Intolerants (XO and YO) and the four phone booths (XN and YN) in a local loop running from lines 470 to 500. Should Bert's position correspond to that of an Intolerant, a subroutine call is made to Line 940 where the horizontal variable of the Intolerant's position is changed to zero. This essentially takes the Intolerant out of the field of play. A PSET instruction at Line 950 changes a blue dot along the left border into yellow to mark the capture of the Intolerant.

Should Bert's position match that of a phone booth, a subroutine call is made to Line 850 where the phone booth is removed in similar fashion so that it may not be reused.

A combination down-counter variable and flag (BF) is set to 20 to initiate and maintain Bert as Battling Blue. See lines 590 and 650 where BF is checked and note the subroutine lines they call. When BF is not zero, the ELSE portion of an IF-THEN-ELSE statement on Line 780 calls a subroutine at 800 which loads up the *Battling Blue figure* with a PUT. Additionally, the BF flag is reduced by a count of one.

The KA variable in Line 510 adds all of the Intolerants' horizontal positions. If all of the Intolerants are captured, then KA will equal zero and can be used later as a flag to permit Battling Blue to penetrate the outer wall of the playing area if he is so inclined.

In Line 520, the random vertical position for the starting point of the barrier wall to be drawn is selected (RND(6)*24+12). Likewise for the starting horizontal position (RND(8)*24+20). These are converted to string variables by STR$ function calls. The additions of 12 and 20 are merely offsets to center the barriers on the screen. The multiplication by 24 is to keep beginning position of the barrier wall to be drawn at evenly spaced positions (the distance between the rows and columns) over the playing area. The direction and distance the barrier is drawn is selected by randomly choosing one of four array string variables (I$(RND(4)). These were initially set to U24, D24, L24 and R24 in lines 130 and 140. Place DRAW and BM at the beginning and you end up with the complete instruction:

```
DRAW"BM"+STR$(RND(8)*24+20)
+","STR$(RND(6)*24+12)+I$
(RND(4))
```

Let's assume RND(8) generates a number 4 on one pass, RND(6) a 1 and RND(4) a 2. Solving for the equation we have:

```
DRAW "BM"+STR$(116)+","+STR$
(36)+I$(2)
```

Now convert the computed numbers to strings and replace I$(2) with the proper string constant.

```
DRAW "BM"+"116"+","+"36"+
"D24"
```

Remove the pluses and we get:

```
DRAW "BM116,36D24"
```

Many will recognize this as a standard Extended BASIC DRAW command which draws a line from Position 116 horizontal and 35 vertical, down 24 positions. What we have done is created a BASIC command on the fly and then executed it. The interpreter makes this sort of controlled random drawing possible.

Next, the horizontal and vertical position of the joystick is read and tested. Depending on these values, IX and IY are each set to -12, 0 or +12. These numbers are significant in that they determine Bert's or Battling Blue's movements left, right, up or down by IX/2 or IY/2 (lines 680, 700, 730, 780) plus they are employed to test for a red barrier impeding Bert's movements in a PPOINT instruction (lines 680 and 730).

Should Bert be changed into Battling Blue, the PPOINT test is left out and his movement is unimpeded (lines 700 and 780) thus permitting his movement to overrun barriers and thereby eliminate their appearance on the screen.

To keep Bert (or Battling Blue) in the center of the rows and columns of the playing field, two variables, XT and YT, are employed in the following manner:

```
XR=(XM-8)/24      YR=(YM)/24
XT=XR-INT(XR)     TY=YR-INT(YR)
```

The INT function converts XR and YR to integer. This eliminates any decimal fractions. YT and XT will be zero only when XM and YM (plus their constants to center the playing area) can be divided evenly by 24. YT and XT can then be used to determine if Bert can be moved vertically (XT=0) or horizontally (TY=0).

If Bert has overcome all the Intolerants (KA=0), his position is checked to see if he exceeds the confines of the playing area (Line 660). If so, the winning message is displayed.

There you have it. Don't forget to save your program on tape or disk. And remember when you start designing your own programs that some instructions employing strings can be constructed of variables and constants generated by the program itself. Good luck!

(Questions about this program may be directed to Mr. Noble at 163 Rolling Road, Lexington Park, MD 20653. Please enclose an SASE for a reply.) ☐

250 ....**48**
490 ......**189**
750 ......**180**
END **181**

The listing: BLUEBERT

```
10 CLS
20 SCREEN 0,0
30 PRINT @167,"BATTLING BLUE BER
T"
40 PRINT@264,"'BARRIER BUSTER'"
50 PMODE 1,1
60 PCLS
70 DIM I$(4)
80 DIM XN(4):DIM YN(4)
90 DIM XO(4):DIM YO(4)
100 DIM VC(0,28):DIM V(0,28)
110 DIM O(0,28):DIM B(0,28)
120 DIM VB(0,28)
130 I$(1)="U24":I$(2)="D24"
140 I$(3)="L24":I$(4)="R24"
150 GET (2,2)-(22,22),VC,G
160 COLOR 2,1
170 DRAW "BM34,2R16D20L16U20D6BR
4R2BR4R2BD2BL4D4BD4BR4L8"
180 GET (32,2)-(52,22),O,G
190 DRAW "BM64,2R16D20L16U20D6BR
4R1BR7R1BD4BL4L1BL4BD2D2R8U2"
200 GET (62,2)-(82,22),V,G
210 COLOR 3,1
220 DRAW "BM94,2R16L2D20L12U20D1
0R12"
230 GET (92,2)-(112,22),B,G
240 DRAW "BM124,2R16D20L16U20BD4
BR4R8BD2BL1L1BL3L1BD4BR2R0BD4BL4
R8"
250 GET (122,2)-(142,22),VB,G
260 PCLS
270 COLOR 4,1
280 DRAW "BM20,12R216D168L216U16
8"
290 PAINT (0,0),3,4
300 FOR V=1 TO 4
310 XN(V)=24*RND(8)+32
320 YN(V)=24*RND(6)+24
330 XO(V)=24*RND(8)+32
340 YO(V)=24*RND(6)+24
350 PUT (XO(V)-10,YO(V)-10)-(XO(
V)+10,YO(V)+10),O,PSET
360 PUT (XN(V)-10,YN(V)-10)-(XN(
V)+10,YN(V)+10),B,PSET
370 NEXT V
380 FOR V=1 TO 8
390 FOR Z=1 TO 6
400 PSET(20+24*V,12+24*Z,4)
410 NEXT Z:NEXT V
420 XM=24*RND(8)+32
430 YM=24*RND(6)+24
440 CX=XM:CY=YM
450 CLS
460 SCREEN 1,0
470 FOR Z=1 TO 4
480 IF (XM=XN(Z) AND YM=YN(Z)) T
HEN GOSUB 850
490 IF (XM=XO(Z) AND YM=YO(Z)) T
HEN GOSUB 940
500 NEXT Z
510 KA=XO(1)+XO(2)+XO(3)+XO(4)
520 DRAW "BM"+STR$(RND(8)*24+20)
+","+STR$(RND(6)*24+12)+I$(RND(4
))
530 J1=JOYSTK(0):J2=JOYSTK(1)
540 IX=0
550 IF J1<2 THEN IX=-12
560 IF J1>61 THEN IX=12
570 YR=(YM)/24
```

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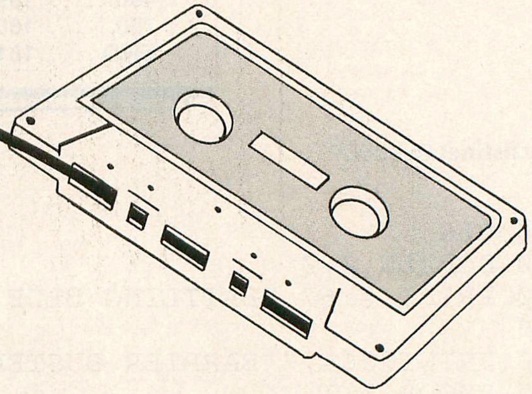

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April 1985 — *CoCo Payroll*, part two of a complete small business payroll system; *Landlord's Helper*, part two of a program that manages rental property; *Surface*, a Simulation that takes you to the North Pole; *Cardio*, a Simulation that transforms you into a heart specialist; *The Adventure Writer's Toolkit*, offers routines for writing your own Adventure; *Run for Your Life*, a survival game; *Concert*, an animated graphics program; and *Porsche*, a graphics representation of the Porsche 930 Turbo. Plus five additional programs.

April 1984 — Seventeen programs from our Gaming (gambling) issue.

```
580 YT=YR-INT(YR)
590 IF BF=0 THEN GOSUB 680 ELSE
GOSUB 700
600 IY=0
610 IF J2<2 THEN IY=-12
620 IF J2>61 THEN IY=12
630 XR=(XM-8)/24
640 XT=XR-INT(XR)
650 IF BF=0 THEN GOSUB 730 ELSE
GOSUB 780
660 IF XM>230 OR XM<26 OR YM>174
 OR YM<18 THEN GOTO 970
670 GOTO 470
680 IF PPOINT(XM+IX,YM)<>4 AND Y
T=0 THEN XM=XM+IX/2
690 RETURN
700 IF YT=0 THEN XM=XM+IX/2
710 IF KA<>0 THEN GOSUB 880
720 RETURN
730 IF PPOINT(XM,YM+IY)<>4 AND X
T=0 THEN YM=YM+IY/2
740 PUT (CX-10,CY-10)-(CX+10,CY+
10),VC,PSET
750 PUT (XM-10,YM-10)-(XM+10,YM+
10),V,PSET
760 CX=XM:CY=YM
770 RETURN
780 IF XT=0 THEN YM=YM+IY/2
790 IF KA<>0 THEN GOSUB 910
800 PUT (CX-10,CY-10)-(CX+10,CY+
10),VC,PSET
810 PUT (XM-10,YM-10)-(XM+10,YM+
10),VB,PSET
820 CX=XM:CY=YM
830 BF=BF-1
840 RETURN
850 XN(Z)=0
860 BF=20
870 RETURN
880 IF XM>224 THEN XM=224
890 IF XM<32 THEN XM=32
900 RETURN
910 IF YM>168 THEN YM=168
920 IF YM<24 THEN YM=24
930 RETURN
940 XO(Z)=0
950 PSET(10,Z*30,2)
960 RETURN
970 PCLS
980 PRINT @225,"BERT BASHES THE
BARRIERS AGAIN"
990 FOR I=1 TO 1400:NEXT I
1000 CLS
1010 STOP
```

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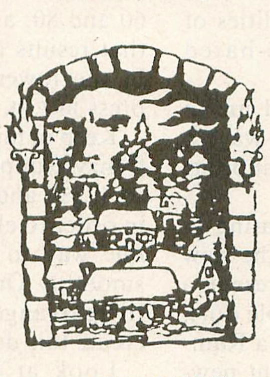

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BASIC TRAINING

16K ECB

Exploring CoCo Graphics

By Joseph Kolar
Rainbow Contributing Editor

What better way to prepare you beginning CoConauts for a voyage through CoCo graphics than to whet your appetites with a preview of coming adventures?

Belinda Ramsey, my vivacious dance instructor at the Fred Astaire Franchised Dance Studio in Inverness, Florida, gave me the original idea and inspired and encouraged me to develop the forthcoming series of 20 tutorials concerning the graphics capabilities of the old 16K, ECB, cassette-based CoCo.

Belinda pushed and prodded me to keep creating. So, what better way to show my appreciation for her support than to give her recognition?

To keep the newcomer salivating in anticipation of working with the new fun graphics series, we will present a graphics panel to perform double duty. A heartfelt thank you to Belinda Ramsey and a tutorial for the patient newcomer to CoColand.

Key in Listing 1. Using the Hi-Res screen in Line 10, beginning at location 0,0 in steps of 2 units, we drew a moire design around a central point, 128,96, in a clockwise direction in lines 20 through 90.

Four separate `LINE` loop routines were used to move `J` around the screen.

We drew the Roman font letters that comprise the name "Belinda Ramsey" and assigned them variable names of our choice in lines 100 through 200. In Line 210, we located and placed the letters onto the screen, in size `S8`, using concatenation.

Now run this. Note in the lower right-hand corner, a pause makes the display hang up for a second before continuing on to completion.

Save Listing 1. Before you enter `NEW`, let's fool around. Change the 2 to 4 in lines 20 and 60, then run and press `BREAK`. Now, try changing the `4` to a `3` in lines 20 and 60, and run. Why is `4` the preferred value instead of `3`? Press `BREAK`. Why can't you use `4` in place of `2` in lines 40 and 80? Try it and see!

Restore the original `2` in lines 20, 40, 60 and 80, and run. Look at the pause that results as CoCo reaches `255,191` in the lower right-hand corner. Now press `BREAK`.

Keep in mind that we are in a creative frenzy. Suppose we wanted to begin at `255,191` and go in a clockwise direction in order to eliminate that glitch? This is one way to make the display appear smoothly. On your own, figure out how to rearrange lines 20 through 90 to create this desired effect.

Look at Listing 2. If you prefer, replace lines 20 through 90 in Listing 1 with those in Listing 2. Change `LINE0` and run. I like this placement better because after the moire border is completed, CoCo jumps up and to the left to display the text. Do you want to save Listing 2?

The sad fact in this true-life situation is that the glitch in Listing 1 was an undetected homemade error by yours truly, which was overlooked in the loop that created the right side of the border, Line 40, in Listing 1. The value, `255` should have been `191`. The glitch occurred because CoCo dutifully marked time by counting from `191` through `255` by 2s, (Step 2), where nothing could happen except letting time elapse. (This anomaly of CoCo's will be discussed in one of the tutorials.) This was corrected in Line 80 in `LISTING2`, my preferred version. You may also want to change lines 20 and 60 from `2` to `4`.

Finally, you may want to type `NEW` and load `"LISTING1"` and remove the glitch. If I had done this in the first place, I would never have gone on and created `LISTING2`, which suits my aesthetic sensibilities a bit more. Moral: Experiment and wander off into uncharted territory. The chances are good that you will have more fun, create something new and learn something exciting about CoCo's foibles.

The brave newcomer may want to create the text that spells out his/her name and dedicate this tutorial panel to him/herself. Be my guest!

Note that Line 10 looks strange. You could add `,1` after `4` and also after `1` without changing the resultant Hi-Res display. CoCo is forgiving and recognizes the abbreviated Line 10 as the default condition.

I am going to share my favorite graphic with you. Sometimes, I call it `LOVEKNOT`. At other times, it is `2SNAKES` or `TAPEWORM`, depending on how cranky I am. It is Listing 3. This animated graphic uses `GET-PUT` statements to achieve this spectacular effect. I like to imagine that it depicts two tapeworms that are writhing around in a glass jar, always keeping a weather eye on me.

They are made to slither in opposite directions, growing longer and longer until they become one intertwined Gordian knot. Notice that the eyes and mouth of both critters alternate colors in a random fashion.

If you get bored with their antics, change `-` to `+` in Line 110, or change Line 120 to read either `K=90-C*R/90` or `K=45-C*R/90`. To get an optical illusion, try changing `*` to `+` in Line 120. Make saves as desired. Type `NEW`.

Speaking of optical illusions, one day when the screen was blank, in the Hi-Res mode, `10 PMODE 4, 1:SCREEN1, 1:PCLS`, and my mind was in a fog, I began near the center of the screen with `20 DRAW"S8BM120,102U10R`

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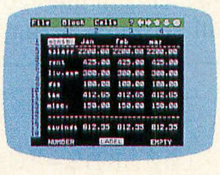
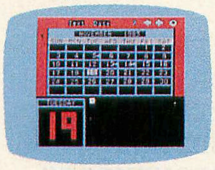

LEDGER

INDEX CARDS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2
3

10D20L20U30R30D40L40U50R50D-60L60U70R70 and 100 GOTO100. I doodled an expanding square, and as the cobwebs settled on my mind, my fingers hovered over the keyboard uncertain what to try next. The fog lifted a mite and I decided to continue Line 20 with D60L10H30 to get to the middle of the expanding square. I continued to doodle by adding BD10F30″ to go back to the outer edge. Then, I started a new line, 30 DRAW ″R10U10H30″. This brought me back to the center with a nearly completed three-dimensional bar. As I gazed intently at the design to try to figure out what my next move would be, I was astounded to notice that sometimes the bar tended to point toward the center from the outside and at others it reversed field and seemed to project outward. I left it incomplete and entitled it 0′<OPTICAL ILLUSION.

If you copy lines 0, 10 and 100 and then slowly add the elements in lines 20 and then 30, you will see how a fog-enshrouded mind works. Make sure after each new directional addition that you add a closing quote mark.

The point I want to make is that you never know what will happen when you play around with CoCo and try to trick him into creating some fun thing. Prepare to have a lot of fun and get maximum usage out of your faithful Color Computer. ☐

Listing 1: BASIC 1

```
0 '<LISTING1> (DEDICATION TO
BELINDA RAMSEY)
5 CLEAR500
10 PMODE4:PCLS:SCREEN1
20 FOR J=0TO255STEP2
30 LINE(J,0)-(128,96),PSET:NEXT
40 FOR J=0 TO 255 STEP2
50 LINE(128,96)-(255,J),PSET:NEX
T
60 FOR J=255 TO 0 STEP-2
70 LINE(J,191)-(128,96),PSET:NEX
T
80 FOR J=191 TO 0 STEP-2
90 LINE(0,J)-(128,96),PSET:NEXT
100 KB$="U6R3FDGNLNL3FDGNL3BR4"
110 E$="BRHU2ER2FDL3BD2R2NEBR4"
120 L$="BU6RD6NLRBR3"
130 I$="RNRU4LBURBD5BR4"
140 N$="BU4FND3ERFD3BR3"
150 D$="BRNR2HU2ER2FD2NGDU6RBD6N
LBR3"
160 A$="BU4R3FDHL2GDFR2ENU2FBR3"
170 KR$="U6R3FDGL2NLF3BR3"
180 M$="BU4FND3ERFND3ERFD3BR4"
190 S$="BUFR2EHL2HER2FBD3BR3"
200 Y$="BUNU3FR2ENU3D2GL2HBUBR7"
210 DRAW"C2S8BM86,90"+KB$+E$+L$+
I$+N$+D$+A$+FA$:DRAW"BM86,110"+K
R$+A$+M$+S$+E$+Y$
220 GOTO220
```

Listing 2: BASIC 2

```
0 '<LISTING2> (REVISED DEDICA-
TION TO BELINDA RAMSEY)
5 CLEAR500
10 PMODE4:PCLS:SCREEN1
20 FOR J=255 TO 0 STEP-2
30 LINE(J,191)-(128,96),PSET:NEX
T
40 FOR J=191 TO 0 STEP-2
50 LINE(0,J)-(128,96),PSET:NEXT
60 FOR J=0 TO 255 STEP2
70 LINE(J,0)-(128,96),PSET:NEXT
80 FOR J=0 TO 191 STEP2
90 LINE(128,96)-(255,J),PSET:NEX
T
100 KB$="U6R3FDGNLNL3FDGNL3BR4"
110 E$="BRHU2ER2FDL3BD2R2NEBR4"
120 L$="BU6RD6NLRBR3"
130 I$="RNRU4LBURBD5BR4"
140 N$="BU4FND3ERFD3BR3"
150 D$="BRNR2HU2ER2FD2NGDU6RBD6N
LBR3"
160 A$="BU4R3FDHL2GDFR2ENU2FBR3"
170 KR$="U6R3FDGL2NLF3BR3"
180 M$="BU4FND3ERFND3ERFD3BR4"
190 S$="BUFR2EHL2HER2FBD3BR3"
200 Y$="BUNU3FR2ENU3D2GL2HBUBR7"
210 DRAW"C2S8BM86,90"+KB$+E$+L$+
I$+N$+D$+A$+FA$:DRAW"BM86,110"+K
R$+A$+M$+S$+E$+Y$
220 GOTO220
```

Listing 3: LOVEKNOT

```
0 'LISTING3  (LOVEKNOT)
10 '(C) 1984, J. KOLAR
20 PMODE4:PCLS
30 A=94:B=98:R=72:P=1.70
40 DIM S(7)
50 CIRCLE(8,8),8,1:CIRCLE(7,7),8
,1
60 DRAW"BM4,6R2BR2R2BDL2BL2L2BD4
BRR4"
70 GET(0,0)-(16,16),S,G
80 PCLS:SCREEN1,1
90 FOR Q=6 TO 4 STEP-2
100 FORZ=1TO2000 STEPQ:C=Z
110 C=90-C*P/180
120 K=C*R/90
130 X=INT(A+R*COS(C)):Y=INT(B+R*
SIN(K))
140 PUT(X+36,Y+10)-(X+52,Y+26),S
,PSET
150 X=INT(A+R*SIN(C)):Y=INT(B+R*
COS(K))
160 PUT(X,Y)-(X+16,Y+15),S, PSET

170 NEXT Z,Q:FOR M=1 TO 4000:NEX
T:PCLS:GOTO90
```

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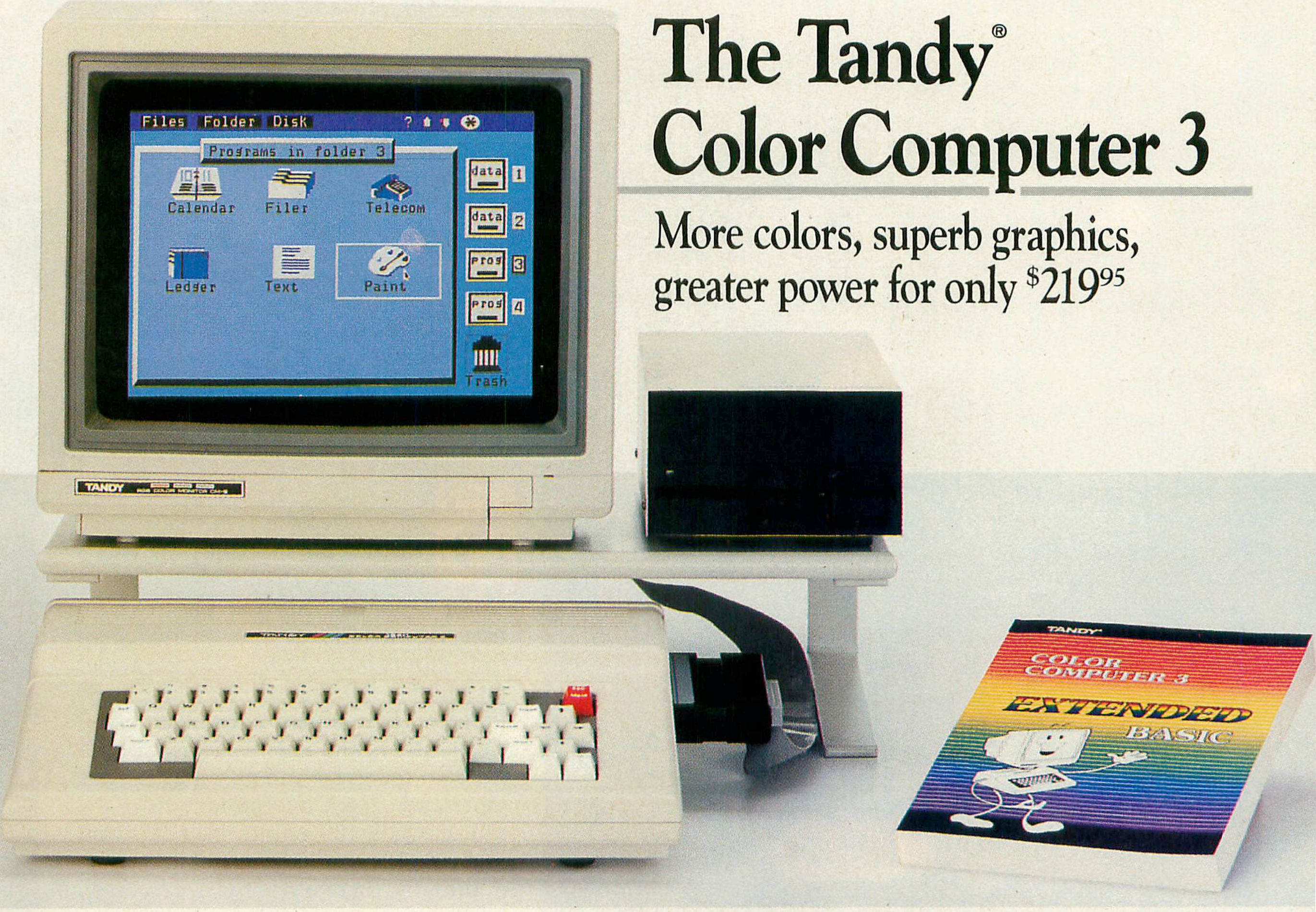

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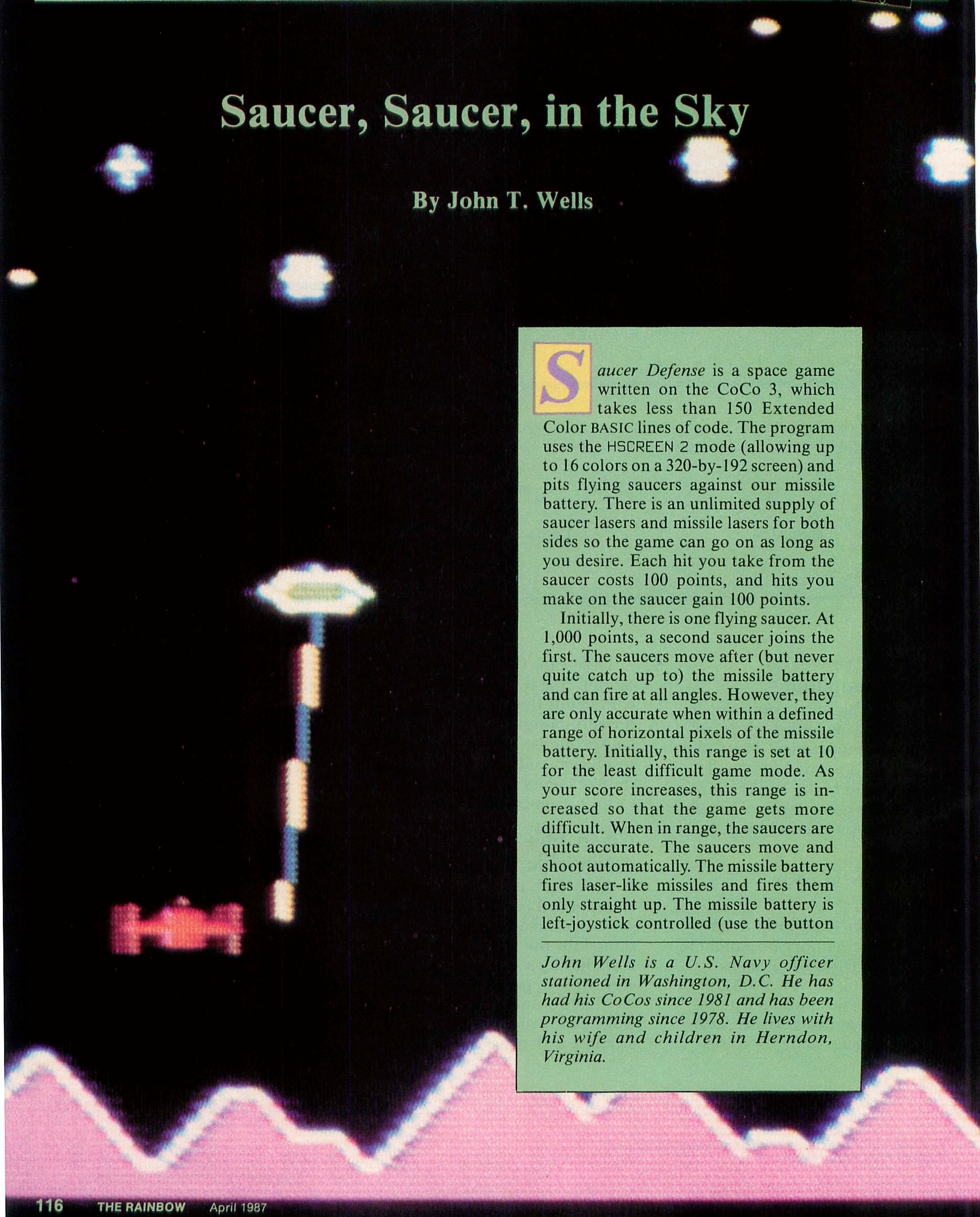
CoCo3

Saucer, Saucer, in the Sky

By John T. Wells



Saucer Defense is a space game written on the CoCo 3, which takes less than 150 Extended Color BASIC lines of code. The program uses the `HSCREEN 2` mode (allowing up to 16 colors on a 320-by-192 screen) and pits flying saucers against our missile battery. There is an unlimited supply of saucer lasers and missile lasers for both sides so the game can go on as long as you desire. Each hit you take from the saucer costs 100 points, and hits you make on the saucer gain 100 points.

Initially, there is one flying saucer. At 1,000 points, a second saucer joins the first. The saucers move after (but never quite catch up to) the missile battery and can fire at all angles. However, they are only accurate when within a defined range of horizontal pixels of the missile battery. Initially, this range is set at 10 for the least difficult game mode. As your score increases, this range is increased so that the game gets more difficult. When in range, the saucers are quite accurate. The saucers move and shoot automatically. The missile battery fires laser-like missiles and fires them only straight up. The missile battery is left-joystick controlled (use the button

---

John Wells is a U.S. Navy officer stationed in Washington, D.C. He has had his CoCos since 1981 and has been programming since 1978. He lives with his wife and children in Herndon, Virginia.

Table 1: Key Variables

Variable	Use
WI	Winning points interval
SC	Score
CT	Bonus points interval
BO	Bonus points award
AD	Hit points
AN	Difficulty level
DF,D1,D2	Frequency of saucers' firing
DI	Accuracy of saucers' firing
C0-C7	Screen objects colors
L1$	Missile laser sound
L2$	Saucer laser sound
L3$	Title page sounds
XZ,YZ	HPRINT X and Y coordinates

to fire) and can only fire when continuously moved. That is, if stopped, no missiles can be fired; however, the saucers will continue to shoot at the missile battery.

The colors of the background and the saucers will change at 1,000-point intervals and 300-point bonuses will be awarded. The game will also increase in difficulty at each of these intervals (by adding to the accuracy of the saucer firings). At 5,000-point intervals, the program will be interrupted with a little fanfare and you will be given the choice of continuing or quitting. This is to put a break in the action and to allow a sense of winning. At any time during the game pressing SHIFT-@ stops the game. Press ENTER to resume playing. Use ESC-BREAK to quit.

While you can hold the firebutton down for continuous firing, it is better to move quickly and get in position, then shoot and quickly retreat out of the saucer's firing range. Also, it may help to wait for the saucer(s) to fire, then move in, fire quickly and retreat. Since the saucers' firing is based on random numbers, doing this is simply playing the odds. The color changing scheme occasionally results in cases where the explosions don't get full color filling. The program is operating normally when this occurs.

The satellites in the background play no part in the game itself.

Table 1 is a list of key variables and their functions. Finally, note that there are four levels of play. The degree of difficulty is far greater at Level 4 than at Level 1. I suggest Level 1 or 2 for your first few games. □

```
150 ......195   800 .......51
280 ......129   1020 .....174
470 ......246   1180 ......45
650 ......194   END .....130
```

The listing: SAUCER

```
0 'SAUCER DEFENSE 12/07/86 BY JO
HN T. WELLS, HERNDON VA VERS1.13
10 POKE65497,0
20 ON BRK GOTO 810
30 HSCREEN 2
40 HBUFF 1,900:HBUFF 2,900:HBUFF
 3,900:HBUFF 4,900
50 HCLS 8
60 WI=5000:CC=0:SC=0:XS=160:CT=1
000:BO=300:AD=100
70 X=100:X1=50:Y=100:SX=150:SY=1
41:C$="H4G3U3L4E4H4E4U2F4E4D3R4G
3F2R3G4F3L3D2L2"
80 L1$="T155;V31;O4;12;11;10;9;8
;7;6;5;4;3;2;1":L2$="T200;V31;O4
;1;2;3;4;5;6;7;8;9;10;11;12"
90 GOSUB830:'****DO TITLE PAGE**
**
95 IF AN<1 OR AN>4 THEN AN=1
100 IF AN=1 THEN DF=20:D1=4:D2=1
6:DI=10
110 IF AN=2 THEN DF=18:D1=4:D2=1
4:DI=12
120 IF AN=3 THEN DF=16:D1=4:D2=1
2:DI=14
130 IF AN=4 THEN DF=14:D1=4:D2=1
0:DI=16
140 EX$="L255T255O1V31;7;3;3;5;1
;2;7;5;5;4;5;7;V25;5;5;5;7;3;7;4
;5;2;V20;3;5;7;7;1;1;2;7;4;V15;3
;5;2;1;2;2;5;5;V10;1;7;4;2;5;8;1
;3;5;7;3;5;3;V5;4;6;7;3;7;2;8"
150 C0=0:C1=1:C2=2:C3=3:C4=4:C5=
5:C6=6:C7=7
160 HDRAW"C3;BM165,82;L8U3D6L1U6
D3R16U3R1D6U6D4U1L16R16L4H4G4":H
CIRCLE(165,82),3,3:HPAINT(166,83
),3,3:HPAINT(166,81),3,3
170 HCIRCLE(128,82),8,C4,.4:HPAI
NT(128,82),C0,C4
180 HGET(0,0)-(40,35),1
190 HGET(150,70)-(180,105),2
200 HGET(110,76)-(140,91),3
210 HPAINT(128,82),C7,C4:HGET(11
0,76)-(140,91),4
220 HPUT(150,70)-(180,105),1,PSE
T
230 HPUT(110,76)-(140,91),1,PSET
240 HDRAW"C4;BM0,190;E10;R5;F5;E
8;R3;E5;R2;F15;R3;E10;R5;F6;R7;F
4;R2;E18;R1;F5;R3;F6;E7;R5;F12;E
2;R6;F3;E12;R4;F10;R10;E3;R2;F5;
R3;E16;F6;R5;F10;R22;E5;F6;R12;E
4;F3;R8;E6;F6;R20"
250 HPAINT(15,190),C6,4
260 HCOLOR 1,8:HPRINT(10,0),"SCO
RE: ":HPRINT(19,0),SC
270 SA=188:SB=10'**** SATELLITES
280 FOR CC=1 TO 25:XX=RND(300):Y
Y=RND(60)+10:HCIRCLE(XX,YY),RND(
3),C4:HPAINT(XX,YY),4,C4:NEXT CC
290 '**** MAIN LOOP ****
300 A=0:B=0
310 XA=X+A:XB=X1+B
320 ZZ=SX-XA:A=A+(ZZ/(RND(4)+2))
330 Z1=SX-XB:B=B+(Z1/(RND(4)+2))
```

```
340 DE=XA-XB:IF DE<40 THEN A=A+2
0:B=B-20
350 GOSUB410
360 IF PO<>XS AND BUTTON(2)=1 TH
EN GOSUB520
370 HPUT(X+A,Y)-(X+A+35,Y+15),1,
PSET
380 HPUT(X1+B,Y)-(X1+B+35,Y+15),
1,PSET
390 GOTO310
400 '**** SAUCER FLYING ****
410 HPUT(X+A,Y)-(X+A+30,Y+15),3,
PSET
420 IF SC>=CT THEN HPUT(X1+B,Y)-
(X1+B+30,Y+15),4,PSET
430 RN=RND(DF):IF RN<D1 THEN GOS
UB740 ELSE IF RN>D2 AND SC>CT TH
EN GOSUB 1080
440 '**** OUR MISSILE BATTERY **
**
450 PO=XS:QQ=JOYSTK(0):J0=JOYSTK
(2):J1=JOYSTK(3):IF J0>53THENXS=
SX+14ELSEIFJ0<12THENXS=SX-14
460 IF XS<45THENXS=45ELSEIFXS>24
0THENXS=240
470 HPUT(SX,SY)-(SX+30,SY+25),1,
PSET
480 SX=XS
490 HPUT(SX,SY)-(SX+30,SY+25),2,
PSET
500 RETURN
510 '**** SHOOT MISSILE ****
520 YY=SY-35
530 PLAY L1$:HLINE(SX+15,YY+40)-
(SX+15,YY),PSET:PP=HPOINT(SX+15,
YY-2):HCOLOR1,8:HLINE(SX+15,YY+4
0)-(SX+15,YY),PRESET
540 IF PP=C0 OR PP=C4 THEN GOSUB
570
550 RETURN
560 '**** SAUCER EXPLOSION ****
570 D$="C2;BM"+STR$(INT(SX+15))+
","+STR$(INT(YY+5))
580 HDRAW D$+C$:HPAINT(SX+15,YY)
,C1,2
590 FOR I=1TO10:NEXTI
600 HPAINT(SX+15,YY+5),C3,2
610 HDRAW D$+C$
620 PLAY EX$
630 HPUT(SX-5,YY-15)-(SX+35,YY+1
5),1,PSET
640 SC=SC+AD
650 HCOLOR8,1:HPRINT(19,0),SC-AD
:HCOLOR1,8:HPRINT(10,0),"SCORE:
":HPRINT(19,0),SC
660 WW=SC/WI:IF WW>0 AND INT(WW)
=WW THEN 1220 ELSE CC=SC/CT:IF C
C>0 AND INT(CC)=CC THEN GOSUB115
0:GOTO160
670 RETURN
680 '**** MISSILE BATTERY EXPLOS
ION ****
690 HCIRCLE(SX+15,YP),10,C6:HPAI
NT(SX+15,YP+2),C3,C6:PLAY EX$
700 SC=SC-AD
710 HCOLOR8,1:HPRINT(19,0),SC+AD
:HCOLOR1,8:HPRINT(10,0),"SCORE:
":HPRINT(19,0),SC
720 RETURN
730 '**** FIRST SAUCER SHOOT ***
*
740 REM PLAY L2$:'**** DELETE  R
EM FOR SAUCER FIRING SOUND ****
750 XP=SX+15:YP=SY+10:DP=X+A+18-
XP:IF ABS(DP)>DI THEN XP=SX+30:'
IF DISTANCE TOO GREAT THEN SAUCE
R'S SHOT MISSES
760 HLINE(X+A+18,Y+9)-(XP,YP),PS
ET:P1=HPOINT(XP,YP+1)
770 HCOLOR1,8
780 HLINE(X+A+18,Y+9)-(XP,YP),PR
ESET
790 IF P1=3 THEN GOSUB690:GOTO80
0
800 RETURN
810 PALETTE CMP:WIDTH32:POKE6549
6,0:END
820 '**** TITLE PAGE ****
830 HCOLOR5,8:GOSUB910
840 LINE INPUT AN$
850 HCOLOR8,8:GOSUB910
860 HCOLOR5,8:GOSUB1040
870 LINE INPUT AN$:PLAY L3$:AN=V
AL(AN$)
880 HCOLOR8,8:GOSUB1040
890 HCOLOR1,8
900 RETURN
910 XZ=8:YZ=8
920 L3$="L255O1V31;12;11;10;9;8;
7"
930 PLAY L3$:PLAY L3$:PLAY L3$
940 HPRINT(XZ,YZ),"S A U C E R
 D E F E N S E"
950 FOR TT=1 TO 200:NEXT TT
960 PLAY L3$:PLAY L3$
970 HPRINT(XZ+7,YZ+2),"BY"
980 FOR TT=1 TO 200:NEXT TT
990 PLAY L3$:PLAY L3$:PLAY L3$:P
LAY L3$
1000 HPRINT(XZ,YZ+4),"J O H N  T
.  W E L L S"
1010 PLAY L3$:PLAY L3$:PLAY L3$
1020 HPRINT(XZ,YZ+6),"PRESS <ENT
ER> TO START!"
1030 RETURN
1040 HPRINT(XZ-5,YZ),"DIFFICULTY
```

```
? 1(EASIEST) - 4(HARDEST)":HPRIN
T(XZ-5,YZ+2),"PRESS YOUR CHOICE
AND <ENTER>"
1050 PLAY L3$:PLAY L3$:PLAY L3$
1060 RETURN
1070 '**** SECOND SAUCER SHOOT *
***
1080 REM PLAY L2$:'**** DELETE R
EM FOR SAUCER FIRING SOUND ****
1090 XP=SX+15:YP=SY+10:DP=X1+B+1
8-XP:IF ABS(DP)>DI THEN XP=SX+30
1100 HLINE(X1+B+18,Y+9)-(XP,YP),
PSET:P1=HPOINT(XP,YP+1)
1110 HCOLOR1,8
1120 HLINE(X1+B+18,Y+9)-(XP,YP),
PRESET
1130 IF P1=3 THEN GOSUB690
1140 RETURN
1150 '**** BONUS AND CHANGE COLO
RS ****
1160 HPRINT(XZ+2,YZ+2),BO:HPRINT
(XZ+8,YZ+2),"POINTS BONUS!":SC=S
C+BO
1170 FOR SS=1 TO 10:PLAY L1$:PLA
Y L3$:NEXT SS
1180 IF AN=1 THEN DI=DI+.5 ELSE
IF AN=2 THEN DI=DI+1 ELSE IF AN=
3 THEN DI=DI+1.5 ELSE DI=DI+2
1190 HCLS8
1200 C0=RND(7):C1=RND(7):C2=RND(
7):C3=RND(7):C4=RND(7):C5=RND(7)
:C6=RND(7):C7=RND(7)
1210 RETURN
1220 '**** QUIT OR CONTINUE ****
1230 HCLS4:HCOLOR 8,8:FOR CO=YZ-
8 TO YZ+2:FOR CR=XZ-6 TO XZ+24 S
TEP 6:HPRINT(CR,CO),SC:PLAY L3$:
NEXT CR,CO
1240 GOSUB 1280
1250 LINE INPUT AN$
1260 HCOLOR8,8:GOSUB 1280
1270 IF AN$="C" THEN SC=SC+BO:HC
LS8:GOTO160 ELSE 810
1280 HPRINT(XZ,YZ+4),SC:HPRINT(X
Z+8,YZ+4),"    POINTS ! ! ! ! !"
1290 PLAY L3$:PLAY L3$:PLAY L3$
1300 HPRINT(XZ,YZ+7),"CONTINUE <
C> OR QUIT <Q> ?":HPRINT(XZ,YZ+9
),"PRESS <C> OR <Q> AND <ENTER>"
1310 RETURN
```

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Requirements: a Coco or Coco II with a minimum of 32K, One Disk Drive (Disk Ext. BASIC 1.0/1.1,ADOS, or JDOS). Printers supported include: Epson RX/FX, GEMINI 10X, SG-10, NX-10, C-Itoh 8510, DMP-100/ 130/ 400/ 430, Seikosha GP-100/250, Legend 808 and Gorilla Bannana. Send a SASE for complete list of compatible printers.

#C332 Coco Graphics Designer $29.95

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SAT & SUN APRIL 12-13
34 HILLTOP LANE GREENLAWN
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GET YOUR TICKETS TODAY!
DANGER
DO NOT ENTER
MOON UNIT CALLING THIN MUFFIN COME IN...
HAPPY
LETS GO SAILING

With Zebra's Coco Graphics Designer it's easy and enjoyable making your own greeting cards, signs, and banners.

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Order Cat#TBRS01

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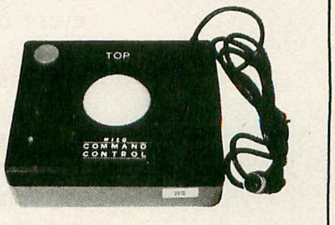

You can benefit from our purchase of brand new WICO Trackball Controllers at closeout prices. This model was designed specifically for the Radio Shack Color Computer and plugs right into the joystick port.

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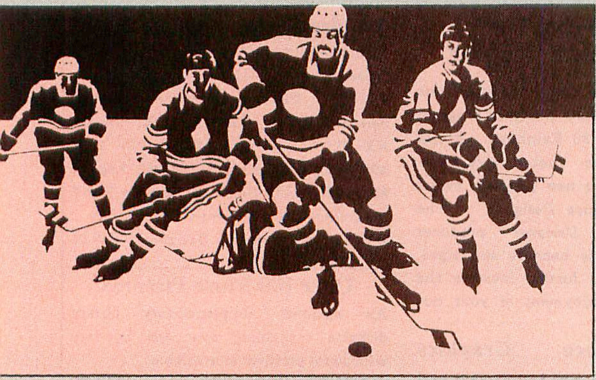


The Tournament Master

By Richard Steinbrueck

You've got a bunch of people who want to get together for fun and fellowship at a sports tournament, and you want every team to get a chance to play every other team. A "round robin" tournament is the way to do it, and *RndRobin* will print out the necessary information to get you raves as the tournament director. I know it works, because I used it to run an 11-team volleyball tournament last year for our church youth association.

RNDROBIN is a BASIC program that prints, on an 80-column printer, dot matrix or daisy wheel, the various assignments for a round robin tournament so that every team/person plays every other team/person once. It can handle from five to 12 teams and also assigns "half-courts" and starting/ending times to each round. There are as many rounds as there are teams. Each round has a place to write the results of three individual games, so that a two out of three competition can be used.

RndRobin also prints out a Win/Loss Summary Sheet to allow the tournament director to keep track of the record of each team each round.

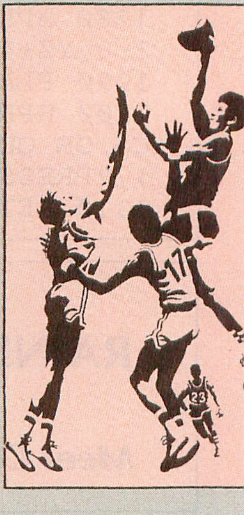
The program assumes there are enough nets and courts, fields, diamonds, etc., to allow all teams to play at once, or in the case of an odd number of teams, for all but one team to play each round. As an example, for nine teams, you need four courts (see Figure 1). When there is an odd number of teams, one team sits out each round. If there is an even number, then two teams rest on the second, fourth, sixth, etc., round.

Half-Court 1 Team A	Half-Court 2 Team I
Half-Court 3 Team B	Half-Court 4 Team H
Half-Court 5 Team C	Half-Court 6 Team G
Half-Court 7 Team D	Half-Court 8 Team F
Team E	(Rest Period)

Figure 1: Nine-Team Court Setup

RndRobin is set up so you can run it right out of the box to see how it works and get an idea of how 12 teams would play. Examine lines 21 to 27 and figure out what has to be changed. Then modify lines 21 to 27 with your own specific numbers and names. You might start by changing only the value for the number of teams in Line 22 to how many your tournament will have and printing the results. When you put in your own team names, put the second team as the first name in the DATA statement and then the rest of the list, then put the first team last.

Richard Steinbrueck holds a master's degree in education and is a former high school wrestling coach. Currently he is a Lutheran youth minister in Valrico, Florida. In addition to writing programs for the CoCo, Richard enjoys raising rabbits.



Those variables that can easily be changed are as follows (by line number):

- 21-names of the competitors, listed as `DATA`
- 22-the number of competitors/teams
- 23-the title (name) of the tournament
- 24-the date of the tournament
- 25-the starting time of the first round
- 26-the length of time for each round
- 27-the length of the break (rest period) between rounds

You can also change lines 120 to 140 for your printer's commands to allow double-wide, double-height printing. In the program now, they are only remark lines with my Citizen 120D codes. But before removing those apostrophies, read your printer manual. The program will work fine with most 80-column printers just as is, and putting in wrong codes could give some unpredictable results.

A second way to enter your own information is to replace lines 20 to 29 with `INPUT`. `INPUT` replaces those lines with a series of `INPUT` statements that you answer each time you run the program. If you like to make changes, reentering the information can be quite tiresome and time consuming. That's why I like to have the variables as part of the program. I save the program with the variables so I can easily try out variations by changing only one aspect each time I run it (such as the length of each match).

Lines 542 to 578 are the subroutine for printing the competition assignment sheets. The format of the sheets can be changed by modifying these lines. In particular, if a two out of three series of games is not used, lines 560 to 569 could be deleted and Line 557 could be changed to `PRINT #-2,"SCORE:` *XX* `to` *XX*`"`.

Since every printer has its differences, the program allows you to stop after printing the set of competitions for each round. This permits adjusting the paper so you can get each round to start at the top of a sheet. I used legal size paper (8 ½ inches by 13 inches) to print out each round using double-height, double-wide print for my 11-team tournament.

RndRobin is a printing program, not a record keeping program. I leave to another RAINBOW reader the challenge of writing a program that allows scores to be entered and then prints out the final results. In my own tournament I was out in the field, so using my CoCo was not advisable and records were kept by hand.

The program is extensively remarked to allow customizing to fit your needs. In addition I have numbered it so that major routines begin at the 100s, making it easier to find them. Generally, I expect this program to be modified extensively as the user customizes it. However, I do not recommend changing margin statements or formulas without careful study, since they affect the program in many different places.

After writing *RndRobin* and preparing it for publication, I remembered a gimmick used by a tournament director to add to the excitement of a round robin tournament; he rearranged the remaining rounds after the first few rounds had been played so that the probable better teams would be playing the last round. It adds a lot to have the deciding match for first and second place played during the last round.

I would like to hear about your use of *RndRobin* and will try to answer any questions. You can reach me at Immanuel Lutheran Church in Brandon, Florida at (813) 681-1526. Have a happy tournament! □

566	149	25	161
770	64	130	124
1010	202	305	244
1200	3	400	133
END	132	527	129

Listing 1: `RNDROBIN`

```
10 'title screen (1-5-87 9 AM)
11 CLS:PRINT@106,"RNDROBIN.BAS"
12 PRINT:PRINTTAB(4)"BY RICHARD
STEINBRUECK"
13 PRINTTAB(6)"1109 LAKEMONT DRI
VE"
14 PRINTTAB(6)"VALRICO, FL  3359
4"
15 PRINTTAB(8)"813/681-1526"
16 PRINT:PRINTTAB(7)"COPYRIGHT 1
987":PRINTTAB(5)"ALL RIGHTS RESE
RVED"
17 FORX=1TO1000:NEXT:CLS
18 CLEAR2000
19 '
20 'listing of competing teams (
max length of each name is 19 ch
ar.)  NOTE: starting with the se
cond team, list all the teams in
 order and then place the first
team's name last.
21 DATA TEAM B,TEAM C,TEAM D,TEA
M E,TEAM F,TEAM G,TEAM H,TEAM I,
TEAM J,TEAM K,TEAM L,TEAM A
22 T=12'number of teams (range f
rom 5 to 12)
23 TP$="1987 ROUND-ROBIN VOLLEYB
ALL TOURNAMENT"'title phrase pri
nted at top of sheets (cannot be
 over 40 characters long)
24 DT$="May 22, 1987"'date
25 H=2:M=00'starting time of tou
rnament
26 L=15'length of each round in
minutes
27 B=5'length of break between m
atches in minutes
29 DIMTS$(T),T$(T),A$(T),N$(T)'T
 rounds of competition with t te
ams
30 'miscellaneous calculations &
 equations
40 LM=0:RM=40'margins set for do
uble-wide printing
50 TP=INT((40-LEN(TP$))/2):DT=IN
T((40-LEN(DT$))/2)
60 NT=1
70 GOTO1000
80 '
100 'Citizen 120D printer codes
```

WE'RE BRINGING THE COCO

RAINBOW'S BROADENING ITS SPECTRUM

THE RAINBOW and the Delphi Information Utility have joined together to allow CoCo owners all over the world to connect with one another!

Delphi is a full-service information utility. It offers everything from up-to-the-minute news stories from The Associated Press to electronic mail services. But, *best of all*, it now has **a special forum for Color Computer owners, and it's operated by the people who bring you THE RAINBOW each month.**

The CoCo Special Interest Group (SIG) features a variety of services, including an *open forum* where you can send and receive messages from Color Computer owners all over the world. It also has several databases to which you can upload your favorite programs and from which you can download programs written by other CoCo enthusiasts. Some of these databases are BASIC programming, OS-9 and home applications.

When setting up your account with Delphi, if you do not have a credit card or prefer not to use it, Delphi requires that you send $20 to give your account a positive balance. This will be refunded after your first free hour if you choose to no longer use the system or it will be applied to future connect charges. If you do not maintain a positive balance, you will be charged $3.50 each month for direct billing.

PEEK INTO THE RAINBOW

The CoCo SIG's conference feature allows you to meet electronically with other members of the CoCo Community. You can join conferences with notables such as Dale Puckett, Cray Augsburg, Marty Goodman, Don Hutchison, Jim Reed, Lonnie Falk and others — on a regular basis. Conference schedules will appear in THE RAINBOW each month. Be sure to check online announcements for changes and additions.

THE OTHER SIDE OF THE RAINBOW

On Delphi, you also are able to buy RAINBOW ON TAPE — order a whole set, or download an individual program immediately. You can also renew your RAINBOW subscription, make a fast and easy order for software or hardware from a multitude of vendors, or inquire about products on the CoCo SIG.

We also have a number of **programs that you can download** and use, just for the cost of the time you spend transferring them. There'll also be **corrections for RAINBOW articles**, helpful hints and many other useful features.

FREE LIFETIME MEMBERSHIP

THE RAINBOW is offering subscribers a free lifetime subscription to Delphi — a $24.95 value — and a free hour of connect time — a $7.20 value at either 300, 1200 or 2400 Baud — so you can sample Delphi and the RAINBOW CoCo SIG. That's right. Your subscription to THE RAINBOW entitles you to this $32.15 value as a ***free bonus!***

If you're not a RAINBOW subscriber, just enter your order when you sign on with Delphi and you'll get the same great deal! For our $31 subscription fee, you'll get the finest Color Computer magazine ever, a free lifetime subscription to Delphi and a free hour of connect time.

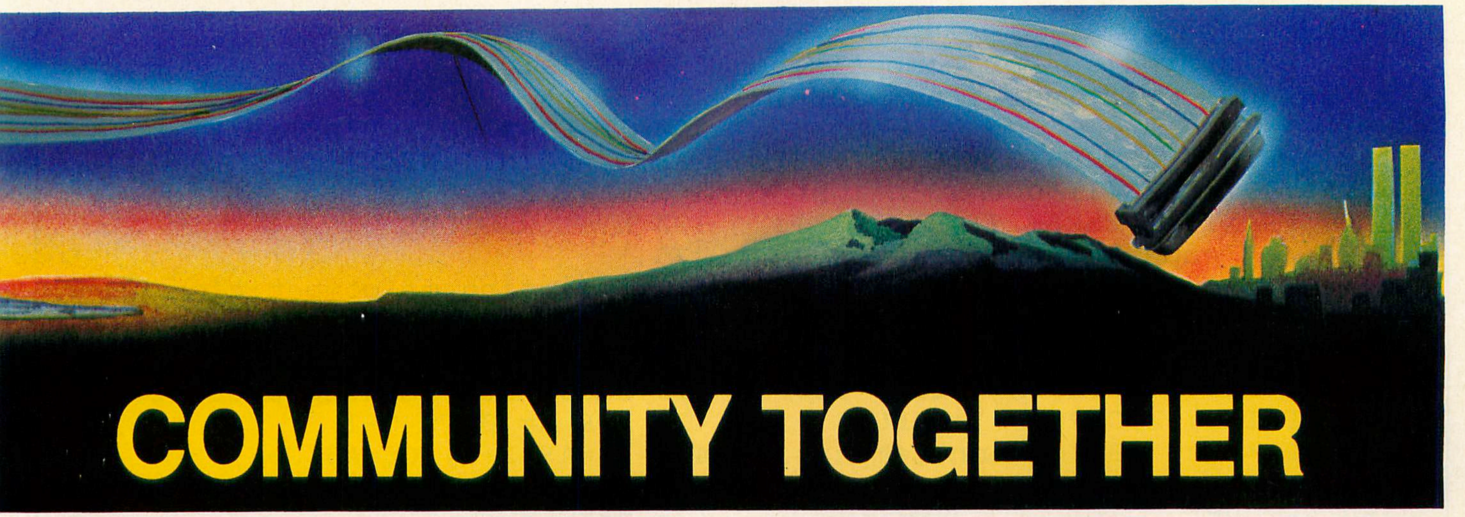
SAVE EVEN MORE

Want to save even more? While you're online you can order, for only $29.95, a deluxe package which includes the Delphi membership, the *Delphi Handbook and Command Card* ($21.95) and a total of three hours of connect time ($21.60).

Delphi provides us all with **Immediate CoCo Community**. Check it out today. After all, you can sample it for free!

Problems? Call Delphi:
(800) 544-4005
(617) 491-3393

DELPHI TYPE:
GROUP COCO



COMMUNITY TOGETHER

How to reach RAINBOW's Color Computer SIG . . .

There are several ways to connect to Delphi and THE RAINBOW's CoCo SIG. In most cities you will not even have to pay long distance charges; you can use special data communications networks like Telenet, Tymnet and the Canadian Datapac network.

First, set your terminal program to operate at either 300 or 1200 Baud (depending on the modem you have), and also select either 7 bits with even parity or 8 bits with no parity, and one stop bit. (If one combination doesn't work, try another.)

Decide which network you should use. There is no surcharge for Telenet or Tymnet. Canadian residents using Datapac will be charged an additional $12 (U.S.) per hour.

On Telenet: The Uninet network has now merged with Telenet. To get the Telenet number for your area, call (800) 336-0437. After you call your local access number and make connection, press the ENTER key twice. When the "TERMINAL=" prompt appears, press ENTER again. When the "@" prompt appears, type `C DELPHI` and press ENTER.

On Tymnet: Call (800) 336-0149 to get the Tymnet number for your area. After you dial your designated number and connect, you will see either "garbage" or a message saying "please type your terminal identifier." At this point, even if the screen is garbled, simply press 'A'. When "please log in:" appears, type `DELPHI` and press ENTER.

From Canada (on Datapac): Call Delphi Customer Service at (617) 491-3393 to get the Datapac number for your area. After you connect, press the period key (.) and ENTER (use two periods if you're using 1200 Baud). Type `SET 2:1, 3:126` and press ENTER. Now type `p 1 3106, DELPHI;` and press ENTER. Delphi's new rates indicate an additional $12 hourly surcharge for evening use of Datapac, which means a total of $18 (U.S.) for connect time.

From other countries: Many countries have their own data networks that can connect to either Telenet or Tymnet. Check with the telephone authorities in your country for details on how to sign up for this service. When you have an account set up, you can reach Delphi with a "host code" of 312561703088 through Telenet, or 310600601500 through Tymnet. (You'll have to pay the toll charges for this connection.)

Type in Your Username

If you're already a subscriber to THE RAINBOW, at the "USERNAME:" prompt, type `RAINBOWSUB` and press ENTER. At the "PASSWORD:" prompt, type your individual subscription number from the mailing label of your latest issue of THE RAINBOW. (If there are one or more zeros at the beginning of this number, include them.)

If you don't already have a subscription, at the "USERNAME:" prompt, type `RAINBOWORDER` and press ENTER. At the "PASSWORD:" prompt, type `SENDSUB` and press ENTER. Have your MasterCard, VISA or American Express card ready, because you'll be led through a series of questions that will enable us to put your RAINBOW and Delphi subscriptions into effect. In an effort to hold down non-editorial costs, we do not bill for subscriptions.

If you make a typing error, just press `ENTER` and start over. Remember that at any point, when you're on Delphi, you can type `HELP` to get help on how to use the system. To get off the system just type `BYE`.

If you find that you're unable to log on to Delphi and enter the CoCo SIG after following these instructions, call us during afternoon business hours at (502) 228-4492. We'll be glad to offer assistance.

Come Visit Us! Type: `GROUP COCO`

After you sign in, you'll be prompted to set up your own, personal "user name" — Delphi is a friendly service, no numbers to remember — and you'll be asked a number of questions so Delphi can set up your account. You'll also be assigned a temporary password. No time is assessed against your free hour of service while you answer these questions.

Delphi will tell you that your account will be ready after 6 p.m. the same day if you sign up before noon (Eastern time zone.) If not, your account will be ready at 6 p.m. the next day. Once an account is opened, *each RAINBOW subscriber will be credited with an hour of free time!*

When you log back in, use your chosen username and your temporary password to access the system. At that point, you will meet Max, who will help you configure things and will change your temporary password into your own *personal* password. This is the password you will use for subsequent sessions — or until you change it.

After Max bids you goodbye, you'll wind up at the Delphi Main Menu; type in `GROUP COCO` and **join us on the CoCo SIG!**

```
(lines 100-140)
110 'printer code for competitio
n schedule printing (lines 120-1
30)
120 'PRINT#-2,CHR$(27);CHR$(126)
;CHR$(49);CHR$(1)'double height
130 'PRINT#-2,CHR$(27);CHR$(33);
CHR$(40)'emphasized double wide
pica (40 columns)
135 RETURN
137 'printer code for win/loss s
ummary sheet printing (line 140)
140 'PRINT#-2,CHR$(27);CHR$(33);
CHR$(8)'pica (80 column),emphasi
zed
150 RETURN
160 '
200 'Hour & Minute Subroutine
205 IF M > 59 THEN M = M-60:H=H+
1
210 IF H > 12 THEN H = H-12
215 RETURN
220 'start & end time of round
225 FOR X = 1 TO T
230 M$=STR$(M):IF M<10 THEN M$="
0"+RIGHT$(STR$(M),1)
235 TS$(X)=STR$(H)+":"+M$
240 M=M+L'length of each round i
n L minutes
245 GOSUB 205
250 M$=STR$(M):IF M<10 THEN M$="
0"+RIGHT$(STR$(M),1)
255 T$(X)=STR$(H)+":"+M$
260 M=M+B'break between matches
in B minutes
265 GOSUB 205
270 NEXT X
275 '
300 'team competition assignment
s
305 CLS:PRINT@160,"  DO YOU WISH
 THE PRINTER TO    PAUSE AFTER I
T PRINTS EACH ROUNDSO YOU CAN AD
JUST THE PAPER TO  GET ONE ROUND
 PER SHEET <Y/N>";:INPUTPP$:IFPP
$="Y"THENPP=1
307 FORA=1 TO T 'round number
310 G=INT(T/2)'# of matches play
ed at the same time
315 IFG<>T/2THENP=1'set P=1 if o
dd number of teams
320 F=0:IF (A/2=INT(A/2) AND P=0
) THENF=1:G=G-1
325 IF A = T THEN 355
330 U=T
335 'reading and assigning team
names
340 FORX=A+1 TO U
345 IF DA=0 THEN READ A$(X) ELSE
A$(X)=N$(NT):NT=NT+1
350 NEXT X
355 FOR X = 1 TO A
360 IF DA=0 THEN READ A$(X) ELSE
 A$(X)=N$(NT):NT=NT+1
365 NEXT X
370 NT=1:RESTORE
375 '
400 'printing of competition sch
edule by round
405 GOSUB 120'printer codes
415 GOSUB 506'heading subroutine
420 FOR X= 0 TO G-1
425 B$=A$(X+1):C$=A$(U-X)
430 GOSUB 545
435 NEXT X
440 PRINT#-2
445 IFPP=1THEN CLS:PRINT@160,"PR
OGRAM PAUSING. <ENTER> TO     CO
NTINUE PRINTING";:INPUTQ$
450 NEXT A
455 PRINT#-2
460 PRINT#-2
465 GOTO1000
470 '
500 'schedule sheet heading prin
t subroutine
503 '
506 CLS:PRINT"PRINTING SHEET HEA
DING"
509 PRINT#-2,TAB(TP)TP$
510 TM$="ROUND #"+STR$(A)+"  "+T
S$(A)+" --"+T$(A):TM=INT((40-LEN
(TM$))/2)
512 PRINT#-2,TAB(TM)TM$
515 PRINT #-2,""
518 'PRINT #-2,TAB(INT((LM+RM)/2
)-16)STRING$(32,"=")
521 PRINT#-2,TAB(4)STRING$(32,"=
")
524 PRINT #-2,""
527 IF P=1THENPRINT #-2,A$(T-G);
" has a bye (Rest period)"'if an
 odd number of teams compete, ea
ch round one has a bye (rest per
iod)
530 IF (P=0 AND F=1) THEN PRINT
#-2,A$(T/2);" & ";A$(T/2+1);" ha
ve byes (rest period)":F=0'if an
 even number of teams compete, e
very other round two teams have
a bye (rest period)
533 PRINT #-2,""
536 RETURN
539 '
542 'subroutine for printing com
petition assignments
545 CLS:PRINT"PRINTING ASSIGNMEN
TS FOR ROUND";A
```

```
548 PRINT #-2,"Half-Court ";2*X+
1;TAB(25)"Half-Court ";2*X+2
551 PRINT #-2,B$;TAB(20)"VS";TAB
(25)C$
554 PRINT #-2
557 PRINT #-2,"SCORES: Game 1 ..
... - ....."
560 PRINT #-2
563 PRINT #-2,"        Game 2 ..
... - ....."
566 PRINT #-2
569 PRINT #-2,"        Game 3 ..
... - ....."
572 PRINT #-2
575 PRINT #-2
578 RETURN
581 '
600 'Summary sheet print routine
610 '
620 GOSUB 140'printer code
630 TM=INT((56-3*T)/2)'compute t
op and bottom margin
640 FOR X = 1 TO TM:PRINT#-2:NEX
T X
650 LM=24-2*T:RM=LM+32+4*T:MS=LM
+RM
660 TP=INT((MS-LEN(TP$))/2)
670 DT=INT((MS-LEN(DT$))/2)
680 WL=INT((MS-22)/2)
690 PRINT#-2,TAB(TP)TP$'from lin
e 22
700 PRINT#-2,TAB(DT)DT$
710 PRINT#-2
720 PRINT#-2,TAB(WL)"WIN/LOSS SU
MMARY SHEET"
730 GOSUB850
740 PRINT#-2,TAB(LM)"TEAM";TAB(L
M+16+2*T)"ROUND #";TAB(LM+20+4*T
)"TOTAL";TAB(LM+26+4*T)"PLACE"
750 FORY=1TOT:PRINT#-2,TAB(4*Y+1
6+LM)Y;:NEXTY:PRINT#-2
760 GOSUB850
770 IF DA=0 THEN FOR X=2 TO T:RE
ADN$(X):NEXTX:READN$(1)
775 FOR X=1 TO T
780 GOSUB840
790 A$=N$(NT):NT=NT+1
800 PRINT#-2,TAB(LM)A$;:GOSUB840
810 GOSUB850
820 NEXTX
830 GOTO860
840 FORY=0TOT:PRINT#-2,TAB(4*Y+1
9+LM)":";:NEXTY:PRINT#-2,TAB(25+
4*T+LM)":";TAB(31+4*T+LM)":":RET
URN
850 PRINT#-2,TAB(LM)STRING$(RM-L
M,"."):RETURN
860 GOSUB850
870 NT=1:RESTORE
880 FORX=1TOTM:PRINT#-2:NEXTX
885 NT=1:RESTORE
890 '
1000 'main menu
1002 CLS:PRINT@42,"RNDROBIN.BAS"
;TAB(37)"BY RICHARD STEINBRUECK"
;TAB(32)STRING$(32,"*");TAB(45)"
MENU"
1010 PRINT@224," <C>OMPETITION A
SSIGNMENT SHEETS <S>CORING SUMMA
RY SHEETS          <I>NSTRUCTIONS"
:PRINT:INPUT" WHAT IS YOUR CHOIC
E";Q$:IFQ$="C"THEN225ELSEIFQ$="S
"THEN600
1100 'instructions
1110 CO$="to continue, press <en
ter>"
1120 RU$="INSTRUCTIONS":RR$="
          ":RS$=STRING$(32,"#"):R$=
RR$+RU$+RR$+RS$
1130 CLS:PRINTR$
1140 PRINT"  RNDROBIN.BAS IS A P
RINTING    PROGRAM DESIGNED TO P
RINT OUT   COMPETITION ASSIGNMEN
TS FOR FROM5 TO 12 PARTICIPANTS
OR TEAMS INA ROUND ROBIN  TOURNA
MENT."
1150 PRINT"  IN A ROUND ROBIN TR
OURNAMENT  EACH OF THE PARTICIPA
NTS OR     TEAMS COMPETES AGAINS
T EACH     OF THE OTHER PARTICIP
ANTS OR    TEAMS.
1160 PRINT@480,CO$;:INPUTQ$:CLS:
PRINTR$
1170 PRINT"  THE WINNER IS DETER
MINED BY   THE BEST WIN/LOSS REC
ORD. IN THEEVENT OF A TIE, THE T
EAM WHO WONTHE HEAD-TO-HEAD MATC
H IS THE   WINNER OF THE TIE.
1180 PRINT"  IF RNDROBIN.BAS IS
RUN AS IS, IT WILL PRINT OUT A T
OURNAMENT  FOR 12 TEAMS.  MODIFI
Y IT FOR   YOUR TOURNAMENT BY ED
ITING LINES21-28 AND REPLACING M
Y VALUES   WITH YOUR OWN."
1190 PRINT@480,CO$;:INPUTQ$:CLS:
PRINTR$
1200 PRINT"  YOU WILL NEED TO KN
OW THE     NAMES OF THE COMPETIT
ORS, THE   TIME OF THE FIRST MAT
CH, THE    LENGTH OF THE MATCHES
 AND THE   LENGTH OF THE BREAK B
ETWEEN EACHMATCH."
1210 PRINT"  ALSO PUT IN THE NAM
E AND DATE OF YOUR TOURNAMENT. R
NDROBIN.BASIS DESIGNED TO PRINT
ON AN 80   COLUMN PRINTER, EITHE
R DAISY    WHEEL OR DOT MATRIX."
1220 PRINT@480,CO$;:INPUTQ$:CLS:
```

```
PRINTR$
1230 PRINT"  RNDROBIN.BAS USES R
EM STATE-  MENTS EXTENSIVELY TO
HELP YOU   IN YOUR MODIFICATIONS
. ALSO,    LINE NUMBERS ARE ARRA
NGED SO    THAT MAJOR ROUTINES B
EGIN AT    100, 200, 300, ETC."
1240 PRINT"  IF YOU HAVE ANY QUE
STIONS,    FEEL FREE TO CONTACT
ME.  IF YOUWRITE, PLEASE INCLUDE
 A SELF-   ADDRESSED, STAMPED EN
VELOPE."
1250 PRINT:PRINT"   ENJOY YOUR T
OURNAMENT!"
1260 PRINT@480,CO$;:INPUTQ$:CLS
1270 GOTO1000
1280 'RNDROBIN.BAS, COPYRIGHT 19
87 BY RICHARD STEINBRUECK, 1109
LAKEMONT DRIVE, VALRICO, FL  335
94, 813/681-1526
```

Listing 2: INPUT

```
20 'INPUT.BAS COPYRIGHT 1987 BY
RICHARD STEINBRUECK, ALL RIGHTS
RESERVED this routine is to be s
ubstitued for lines 21-29 in RND
ROBIN.BAS
21 DA=1:YN$="IS THIS CORRECT <Y/
N>":CLS:INPUT"HOW MANY TEAMS IN
THE TOURNAMENT(5-12)";T:IF(T<5 O
R T>12)THENCLS:GOTO21
22 DIMN$(T),TS$(T),T$(T),A$(T):C
LS:PRINT"ENTER YOUR SECOND TEAM,
 CONTINUE WITH YOUR LIST, ENTERI
NG  THE FIRST TEAM LAST.":PRINT:
PRINT"MAX LENGTH OF NAME IS 19 C
HAR":FORX=1TOT:PRINT"NAME OF TEA
M";X;:INPUTN$(X):NEXTX:PRINTYN$;
:INPUTQ$:IFQ$="N"THEN22
23 CLS:PRINT"WHAT IS THE NAME OF
 YOUR TOURNA-MENT (MAX. 40 CHARA
CTERS)":INPUTTP$:PRINTYN$;:INPUT
Q$:IFQ$="N"THEN23ELSEIFLEN(TP$)>
40THENPRINT"TOO LONG-TRY AGAIN":
FORX=1TO1000:NEXTX:GOTO23
24 CLS:PRINT"WHAT IS THE DATE OF
 THE TOURNA- MENT (IE. MAY 10, 1
987)":INPUTD$,Y$:PRINTYN$;:INPUT
Q$:IFQ$="N"THEN24ELSEDT$=D$+", "
+Y$
25 CLS:INPUT"WHAT TIME DOES THE
TOURNAMENT   START (HH,MM) NOTE
COMMA BETWEENHOUR AND MINUTES";H
,M:PRINTYN$;:INPUTQ$:IFQ$="N"THE
N25ELSEIF(H<1 OR H>12 OR M<0 OR
M>59)THEN PRINT"TRY AGAIN":FORX=
1TO1000:NEXTX:GOTO25
26 CLS:INPUT"HOW MANY MINUTES LO
NG IS EACH   ROUND";L:INPUT"HOW
LONG IS EACH BREAK BETWEEN  EACH
 ROUND";B:PRINTYN$;:INPUTQ$:IFQ$
="N"THEN26
27 CLS:PRINT"this is the informa
tion you haveentered":PRINT"THER
E ARE";T;"TEAMS IN ";TP$;" ON ";
DT$;" STARTING AT ";M;"MINUTES A
FTER";H;".  EACH ROUND IS";L;"MI
NUTES LONG WITH A";B;"MINUTE BRE
AK BETWEEN EACH ROUND.":PRINTYN$
:INPUTQ$:IFQ$="N"THEN21
28 PRINT"THE TEAMS ARE:":FOR X=1
 TO T:PRINTN$(X):NEXT X:PRINTYN$
;:INPUTQ$:IFQ$="N"THEN21
29 '
```

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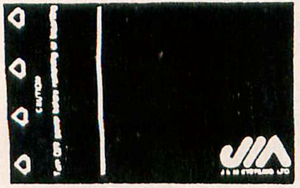

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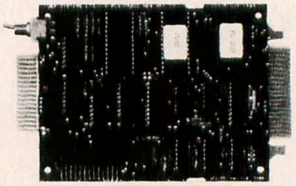

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PIPELINE

DANGEROUS BOOK At what point does knowledge become too dangerous to print? This is a question posed by many over the growing popularity of *The Hacker's Handbook*, a book about breaking into computer systems. Many people feel that the proliferation of this sort of information is dangerous and will encourage computer crime. Publisher Eben Brown of E. Arthur Brown Company disagrees. "The only threat to computer security is ignorance," he says. The book appears to be doing remarkably well. Brown says more than 60,000 have been sold and he's just taken delivery on a third press run. *The Hacker's Handbook* is available at many bookstores. You can also order it directly from the publisher. The price is $12.95. *Contact E. Arthur Brown Company, 3404 Pawnee Drive, Alexandria, MN 56308, (612) 762-8847.*

GENERIC? The BLACK BOX Basic Buffer will receive data through either a parallel or serial interface at a user-selectable baud rate (any of 16 between 50 bps and 38.4K bps), then transmit that data to either an RS-232 serial or Centronics parallel printer. This device, priced at $349, will accommodate four transmission modes and has serial or parallel input and output ports for compatible cables. Both input and output speed and communication control switches are adjacent to both ports, providing easy access for setting configurations. With a 256K storage capacity that enables the user to print up to 256 copies of its contents, the Basic Buffer is flexible for most business needs. *Contact BLACK BOX Catalog, P.O. Box 12800, Pittsburgh, PA 15241, (412) 746-5500.*

ONLINE SURPRISE While she was browsing through the *Kussmaul Encyclopedia*, an electronic encyclopedia on Delphi, a few months ago, Elizabeth M. Ferrarini found something most unusual — in addition to information on such computer luminaries as Steve Jobs and Adams Osborne, she found an entry about herself! "I was stunned," says Ferrarini. "I was looking for biographies of people who fueled the growth of microcomputing. And I came across *my* name." Although she doesn't have as much notoriety as either Jobs or Osborne, her formula for writing about online services has received its share of recognition. At Spring Comdex, the Computer Press Association gave her book, *Infomania: The Guide to Essential Electronic Services*, (published by Houghton Mifflin Company) the Best Computer-Book-of-the-Year Award. Of course, Ferrarini is undoubtedly flattered with even a one-line mention in the encyclopedia. She said, "I have no idea why Wes Kussmaul, the founder of Delphi, or anyone else at the service would even put my name in the encyclopedia . . . ." For more information about Delphi and the *Kussmaul Encyclopedia*, consult Ferrarini's *Infomania*. A whole chapter is devoted to the service. In fact, Russ Lockwood of the *Louisville Times* said, "Few people have explored the curves and crossroads of the data highways as thoroughly as Ferrarini. Along the way she checks in . . . at attractions such as . . . Delphi."

COST DOWNGRADE In a move to further strengthen its position as a price/performance leader in the printer marketplace, Epson America Inc., has announced a price reduction on some of its products. Prices on the Epson LQ-800 and LQ-1000 24-pin dot matrix printers and the EX-800 and LS-86 nine-pin dot matrix printers will be reduced. The LQ-800 will be reduced from $799 to $699 and the LQ-1000 will be reduced from $1095 to $995. In the low-end dot matrix market, the LX-86 will be reduced from $349 to $299 and the EX-800 from $749 to $649. At press time, information was unavailable as to when these cost reductions would take place. For more information, *contact Epson America Inc., 2780 Lomita Blvd., Torrance, CA 90505.*

Dave Haber has informed us that his programs *CoCo Checkbook*, *CoCo Video Titler* and *VIP Writer Enhancer* are now available exclusively from Foxy Software, 11684 Ventura Boulevard, Suite #388, Studio City, CA 91604.

Corrections

"Success Mansion" (January 1987, Page 108): Line 1310 of the listing for `SUCCESS` was "overpacked." Due to its length, when it was `LLIST`ed to the printer, the buffer used internally by the CoCo's detokenizing routine could not hold all of the expanded line after detokenization. Thus, the final 0 was omitted.

The last `BASIC` statement in the line should be `GOTO430`, whereas it now lists as `GOTO43`. To add the final zero to the line, enter `EDIT1310`. Then press X to get to the editor's "extend mode" and press 0 as the last character. Press `ENTER` and save the corrected listing. Also, Line 10 of the program contains a `FILES` statement that will wreak havoc with tape systems. If you are using tape and encounter this problem, just reenter Line 10 as follows:

```
10 CLEAR 1024
```

"Baseball Card File" (May 1986, Page 66): If you try to edit a card with the present version of `BASEBALL`, the card will disappear. To correct this, make the following changes:

Line 650 - reverse the positions to `N1$=N$`

Line 680 - reverse the positions to `T1$=T$`

Line 710 - reverse the positions to `Y1$=Y$`

Line 740 - reverse the positions to `C1$=C$`

Also, change Line 770 to read:

```
IF LEFT$(Q$,1)<>"Y" THEN M1$=M
$:GOTO790
```

"Date Tracking Through the Ages" (January 1987, Page 46): Roger Bouchard has written to tell of some corrections to his program, *The Last Calendar*. First, Line 570 should read:

```
570 FOR ML=0TO BM-2:J=J+M
(ML):NEXT
```

Also, in lines 160 and 660, the value of `40` should be changed to `36`. This value appears only once in each line. Finally, lines 100 and 110 contain the printer control codes necessary to enable the elongated character mode and disable this mode, repectively. Change them to suit your particular printer.

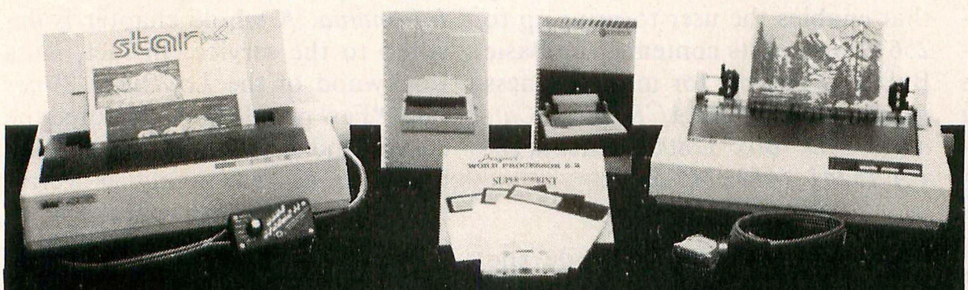
"Escape From the Bug Zone" (January 1987, Page 58): Eugene Vasconi has informed us of some typographical errors that appeared in his article. These errors may be confusing to newcomers. Both errors appear on Page 59. First, the sixth line in column two should read:

```
PLAY"T255L255;O1;
ABCDEF;XZ$;"
```

The other error is in Line 35 of Column three. The sentence that contains the error should read:

"Your problem then becomes the X=X*2 statement, which maybe needed to be an X=X+2."

For quicker reference, Corrections will be posted on Delphi as soon as they are available in the Info on Rainbow topic area of the database. Just type `DATA` at the CoCo SIG prompt and `INFO` at the Topic? prompt.



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RECEIVED & CERTIFIED

The following products have recently been received by THE RAINBOW, examined by our magazine staff and approved for the Rainbow Seal of Certification, *your assurance that we have seen the product and have ascertained that it is what it purports to be.*

This month the Seal of Certification *has been issued to:*

An Algorithm That Works, a book that contains routines that make animation from BASIC look almost like machine language. The book explains the methods used and includes listings of the routines plus tips on animation, programming techniques and a text screen clear subroutine. *Right Brothers Software, 1173 Niagara Street, Denver, CO 80220; (303) 377-3409, $9.95 plus $2 S/H. Accompanying disk, $5.90.*

BSS Disk Manager, a disk management utility for the CoCo 3. This program lets you view your disk directory, move, copy, print, rename, transfer and kill files. Select a subset of names or work with the entire directory at one time. *Bangert Software Systems, Box 21056, Indianapolis, IN 46221; (317) 262-8865, $14.95 plus $2 S/H.*

Backup, a backup utility for the CoCo 1, 2 or 3. This program features an onscreen window that displays data being backed up; error bypass; 35-, 36-, 40- and 80-track compatibility; backs up 10 tracks at a time. *Backup III* features all of the above but makes use of the full 128K in the CoCo 3. *Brainchild Software, Route #5, Calhoun, GA 30701;* Backup , *$8.95;* Backup III, *$10.95, plus $2 S/H.*

Bargain Disk, two-disk package containing classroom drill programs. Titles include *Build-A-Word, Guess My Word, Error Trap Spelling, Error Trap Number Facts, Guess My Number, Skip Counting, Robot Counting, Flash Card Drill* and *Counting Things. Thompson House, P.O. Box 58, Kamloops, B.C., Canada V2C 5K3; $22.95.*

Cave Walker, a 64K OS-9 program that combines the challenge of an Adventure with the excitement of an arcade game. Grab your hat and enter the legendary Cave of the Mystics. Within this underground palace, magical spells and treasures abound. Requires one disk drive and joystick, and features enhanced color graphics available under OS-9 Level II. *Tandy Corporation, Available in Radio Shack stores nationwide; $24.95.*

Champion, an arcade-type Adventure game. Take on the role of superhero and become a crusader for all that is right and good. Use special powers to fight the criminal mastermind, Mr. Bigg, and his sinister followers. This 64K game has Hi-Res graphics and sound effects, and requires a joystick. *Mark Data Products, 24001 Alicia Parkway, No. 207, Mission Viejo, CA 92691; (714) 768-1551, Disk only, $27.95.*

Color Computer 3 Basics and Graphics, a guide to using the CoCo 3. Includes descriptions of the 64 composite and RGB colors plus palette suggestions, as well as reviews of hardware and software for the CoCo 3. A disk with pictures and programs is provided. *Moreton Bay Software, 316 Castillo Street, Santa Barbara, CA 93101; (805) 962-3127, $19.95.*

Computer Bible Trivia, a 64K game requiring one disk drive. This program contains over 600 questions about the Bible. Player selects book of the Bible and answers questions. For CoCo 1, 2 or 3. *Sovereign Grace Software, 221 Highview Drive, Ballwin, MO 63011; (314) 227-3238, $17.50 plus $2.50 S/H.*

The SECA Coupon Filer, a 64K management system designed to help the buyer track store coupons. This program will handle up to 200 coupons, and the user can add, delete, search for expiration dates or select coupons for use. For CoCo 1 or 2. *SECA, P.O. Box 3134, Gulfport, MS 39505; (601) 832-8236, Disk only, $19.98 plus $3 S/H.*

Directory Viewer, a 64K program to transfer and catalog directories of other disks to one index disk. The program will also let the user recover a lost disk due to a directory crash by transferring the directory from the index disk back to the damaged file. For CoCo 1, 2 or 3. *SECA, P.O. Box 3134, Gulfport, MS 39505; (601) 832-8236, Disk only, $19.98 plus $3 S/H.*

Disto Super RAM 3, a 512K memory upgrade for the new CoCo 3. Includes step-by-step instructions for solderless installation. This plug-in card is compatible with OS-9 Level II. *C.R.C. Computer, Inc., 10802 LaJeunesse, Ste. 102, Montreal, Quebec, Canada H3L 2E8; (514) 383-5293, $99.95.*

FKEYS III Version 1.0, a function key utility designed for the CoCo 1, 2 or 3. Can be programmed for 20 different functions using the F1 and F2 keys. Custom versions can be saved to disk and loaded into RAM or programmed into an EPROM. *Spectrum Projects, Inc., P.O. Box 264, Howard Beach, NY 11414; (718) 835-1344, $24.95 plus $3 S/H.*

File Viewer, a 64K program to enable the user to view all files on a disk on the screen at one time. Each file is displayed with its file code. Using one of the single command keys, the user can load and execute most BASIC or machine language programs. For CoCo 1, 2 or 3. *SECA, P.O. Box 3134, Gulfport, MS 39505; (601) 832-8236, Disk only, $19.98 plus $3 S/H.*

Fourcube, a three-dimensional extension of tic-tac-toe. The board consists of a 4-by-4-by-4 grid of cells and six levels of difficulty. This 32K game can be played by one or two players using the keyboard or joysticks. For CoCo 1, 2 or 3. *Tom Mix Software, 4285 Bradford NE, Grand Rapids, MI 49506; (616) 957-0444, Disk $18.95; Tape $15.95 plus $3 S/H.*

The SECA Fraction Review, a 64K high resolution game designed to aid the student in learning the basic concepts of adding and subtracting fractions. The student can select common and non-common denominators, and single- or double-digit denominators. Recommended for students in grades five through eight. For CoCo 1, 2 or 3. *SECA, P.O Box 3134, Gulfport, MS 39505; (601) 832-8236, Disk only, $24.98 plus $3 S/H.*

Gold Finder, a 32K arcade game requiring one or two joysticks. Players advance through 69 levels picking up pieces of gold while avoiding the enemies. For CoCo 1, 2 or 3. *Tom Mix Software, 4285 Bradford NE, Grand Rapids, MI 49506; (616) 957-0444, $27.*

Lunchtime, a 32K game requiring joysticks. Your chef, Peter Pepper, is surrounded. Dodge pickles, hot dogs and eggs while building hamburgers. This Hi-Res game features seven levels of difficulty for one or two players. For CoCo 1, 2 or 3. *Tom Mix Software, 4285 Bradford NE, Grand Rapids, MI 49506; (616) 957-0444, Disk $21.95; Tape $18.95 plus $3 S/H.*

MYDOS, an enhancement to CoCo 3 Disk BASIC 1.1 operating system. New commands include `XRUN`, which uses the same syntax as `LOADM`; `LCASE` to input in lowercase mode; `MDIR` lists a two-column directory to the screen and allows you to load and run a program with a point and click of the mouse or joystick; `MOUSE` puts all characters on the keyboard on the top two lines of the screen; `VOICE` controls RS speech synthesizer; `SAY` lets the computer talk to you. Versions are also available for the CoCo 1 and 2. *Hawksoft, 307 Sexauer Avenue, Elgin, IL 60123; (312) 742-3084, Software, $15; Customized EPROM, $35.*

Soundscope, a 16K program to make sound waves visible. The user can play a cassette of music or conversation and view the continually changing patterns onscreen in one of various possible modes. Screens can be frozen for closer study or printed using any screen dump program. *Tothian Software, Box 663, Rimersburg, PA 16248; tape or disk, $19.95.*

Stop Burn, a machine language utility that darkens the text screen when you leave your CoCo unattended. Once installed, the program works automatically. *Lucas Industries 2000, 14720 Cedar Street NE, Alliance, OH 44601; (216) 823-4221, $15.*

TV Blackout Bingo, plays up to 50 bingo cards as you play your favorite TV bingo game. Supplied with the disk and manual is a code plug to be installed in the right joystick socket of the computer. For CoCo 1, 2 or 3. *Sunrise Software, 8901 NW 26th Street, Sunrise, FL 33322; (305) 748-0775, $19.95 plus $2 S/H.*

The Word Factory's Synonyms & Antonyms, a 64K high resolution game for one or two players to aid in learning the concepts of synonym and antonym usage. The program package consists of four separate programs: the game, a program to create new word lists, classroom multiple choice test sheets, and a spelling checker. For CoCo 1, 2 or 3. *SECA, P.O. Box 3134, Gulfport, MS 39505; (601) 832-8236, Disk only, $19.98 plus $3 S/H.*

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

— Judi Hutchinson

You'll Get a Kick Out of *Rocky's Boots*

If memory serves, we've had *Rocky I* through *IV*, Rocky Road (ice cream), *Rocky and Bullwinkle*, and now, just in time for those forlorn Rocky lovers, we have *Rocky's Boots*!

Indeed, an unlikely title for a book, magazine article or software review. But that is exactly what *Rocky's Boots* is — software, and very good software at that. Written and designed by Warren Robinett, *Boots* has been ported over to the CoCo by The Learning Company.

Boots is an exercise in science and logic cleverly disguised as a game. Somehow, kids seem to have a sixth sense about educational software — no doubt, aversion conditioning brought on by repeated exposure to tedious and often downright boring programs inflicted upon them by well-meaning parents. With *Boots*, parents may forgo any misgivings — *Rocky* answers the call!

The program is entirely self-prompting — kids, not unlike their parents, hate to waste time reading the instructions. The program is essentially an electronic erector set, replete with AND, OR and NOT gates, wires, switches, timers, flip-flops, and the like. *Rocky*'s world is divided into rooms, some containing equipment, others with sensors, targets, instructions and game selection menus.

The first-time visitor is taught how to move through Rocky's world, and then is taken on a tour of the equipment areas and shown how to assemble the various components. After an initial exploration, the program explains concepts and principles involved in constructing machines utilizing AND, OR and NOT gates. The "inventor" (player) is then welcomed to the game area. Here, he is presented with a group of unique targets and three "sensors." *Rocky*'s challenge is to construct a machine (circuit) that will cause Rocky's boot to kick a selected subgroup of targets off of the conveyer belt as they move by the various sensors. As each sensor is activated, the inventor observes the flow of electricity through his machine and immediately observes the result of his decisions. The rapid feedback loop to the inventor appears to be one of the central appeals of the game to young folks. As the game progresses, the inventor has to recognize positive and negative values, and identify and debug glitches in his circuit — all the while applying the rules of logic (Boolean, combinatorial and sequential) to the solution of the game. Before these principles may be successfully employed, the young inventor must add his own ideas of creative problem-solving to the game. The problem must first be identified. In doing this the inventor finds that heretofore unknown powers of abstraction and inference are called upon. While all of this is going on, the children I've observed playing *Boots* have had an almost deliriously good time! *They like to think* (if they don't realize that some folks equate thinking with work). To design and build a functioning, animated machine and then have the immediate opportunity to see if it, indeed, does work, is tremendously statisfying for kids of all ages. And if it doesn't work? The inventor has the immediate capability to redesign all or part of his creation and fire it up again. No solution is ever wrong, but young players soon realize that some solutions are more efficient than others. Given a chance, the youngsters I watched demonstrated insights that were absolutely astounding. I emphasize "given a chance," as it is a genuine struggle for any adult to watch the game progress without interjecting his own ideas and suggestions.

There is no time pressure in *Boots*; each player proceeds at his or her own pace. With the absence of wrong answers, nearly all negative feedback is avoided. Rather, the entire structure of *Rocky* is aimed at immediate, positive feedback. The graphics are excellent, with screen designs that are attractive, but not so busy as to overwhelm the younger players. However, the joystick routines are mediocre at best. This appears to be the only real shortcoming. The joysticks react very slowly to the user prompts. As young folks are just developing fine motor and hand-eye coordination skills, the sluggish joystick response is a source of frustration in some cases.

The documentation for *Boots* is on a level befitting the overall excellence of this package. Each level is fully explained, and suggestions and concepts are outlined for the benefit of interested parents and teachers. While the authors suggest that *Boots* is written for ages 9 and up, the concepts are sufficiently well-presented so younger children may thoroughly enjoy and benefit from exposure to *Rocky* and his "electrifying" world. At the other extreme, *Rocky* has the capability to expand and grow in complexity as the inventor gains experience. A fully featured game editor is provided that enables you to create totally original problems, and a game save feature is also provided — a necessary complement for the more difficult levels. Children of all ages have a limited attention span — and who wants to destroy an original creation that represents real effort and achievement?

Boots is supplied on a single, unprotected disk recorded on both sides. Minimum system requirements are 64K with at least one disk drive. The use of a joystick, while optional, greatly enhances the quality of play. Side One supplies the required OS-9 Level I, Version 2.0 boot routine and game initialization schemes. After booting OS-9, the disk is reversed and the game auto-executes after pressing ENTER.

Boots will run on the CoCo 3, but it does so in black and white on an RGB monitor. With an 8CM515 and CoCo 2, the graphics are quite satisfactory, and the artifacted colors are visible with the CoCo 3 in the composite input mode.

The package jacket is liberally annointed with accolades from such diverse sources as *Time Magazine, Popular Computing* and *The New York Times*. It has received the "Software of the Year" award from *Learning Magazine*, as well as numerous other awards in the educational software arena.

If you have a CoCo 2, and any children or a vestige of childlike wonder for exploration and creative thinking yourself, give *Rocky's Boots* a try — you won't be disappointed!

(The Learning Co., 545 Middlefield Rd., Suite 170, Menlo Park, CA 94025; 415-328-5410, $34.95. Available in Radio Shack stores nationwide)

— Henry Holzgrefe

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Disk indicates available on disk only.
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Every CoCo Can Make the *Color Connection*

Many changes have been made to the latest version of *Color Connection* from Computerware. This excellent telecommunications package has consistently reflected a high level of versatility, but with the enhancements for the new CoCo 3, this program is an outstanding value from any standpoint.

When you buy the program, you are supplied with a version for the earlier CoCos and the CoCo 3. Users of the earlier versions of *Color Connection* will readily recognize it; it has been enhanced to take advantage of the new CoCo's superior capabilities, rather than changed as a whole. It has three outstanding features that lift it head and shoulders above most other terminal packages for the Color Computer now on the market.

The first of these is the capability of *Color Connection* to output 300, 600 and 1200 baud through the rear serial I/O port of the CoCo 3. This means that a 1200 baud Hayes-compatible modem can be connected directly to the CoCo 3, and the program's command sets will drive the modem for auto-answer/auto-dial. Some Radio Shack modems with auto-answer/auto-dial are also supported. *Color Connection* can be used with the Radio Shack Deluxe RS-232 pack, providing baud rates of 300 to 9,600 bps (bits per second).

Color Connection's second outstanding feature is the new option 'G' from the main menu, the video set feature. This allows the user of the CoCo 3 with a color composite or the new Analog RGB monitor to set an amber, green or blue screen, or the inverses of these colors in 40-, 60- or 80-column widths. The image is incredibly crisp and clear in all modes on the CM-8 RGB. The amber tends to look more like a lime green than a yellow, however.

A third feature of this program is its file transfer protocols. *Color Connection* supports Xmodem, Xon/Xoff and CompuServe 'B' protocol file transfer modes. This feature alone makes the program worth the purchase price. I tested the buffer dump and upload/download features of this program extensively and it operated flawlessly under all conditions.

> ***"This is a feature-packed program that can handle all your telecomputing needs . . ."***

Several more added features should be noted: *Color Connection* has a 65K buffer. That is a full 65K of user space at a time. Buffer space remaining is displayed online in terminal mode. The CONTROL key is now used both for menu commands and to send control characters, instead of the CLEAR key.

I only found a few minor drawbacks to the program, which are at the annoyance level when encountered, but the prospective user should be aware of them. The manual is well-written and understandable, but must be read to fully utilize the program's features. There is no online help, and while the program is menu-driven, there are places where a specific answer is required to change an option and the manual must be consulted to determine how to do this.

The control codes while online were not always functional. There were times when the computer was accepting or transmitting data when it simply would not respond to a control sequence until the transmissions had stopped. Lastly, in the Keyboard to Buffer feature, where the user can input directly to the buffer from the keyboard, it is possible to erase all or most of a screen of data by hitting the CLEAR key accidentally on the CoCo 3. Also, when I went to input more information after viewing a buffer, what had been there was gone. So save that buffer first.

Aside from these drawbacks, this is a feature-packed program that can handle all your telecomputing needs, most effectively, with class and with style. There is, of course, the disk-based introduction to data communications, which can teach the new user quite a lot about what is going on behind the scenes with a modem. I recommend the *Color Connection* for the Color Computer 3 without reservation.

(Computerware, P.O. Box 668, Encinitas, CA 92024; 619-436-3512, $49.95 plus $2 S/H)

— Jeffrey Parker

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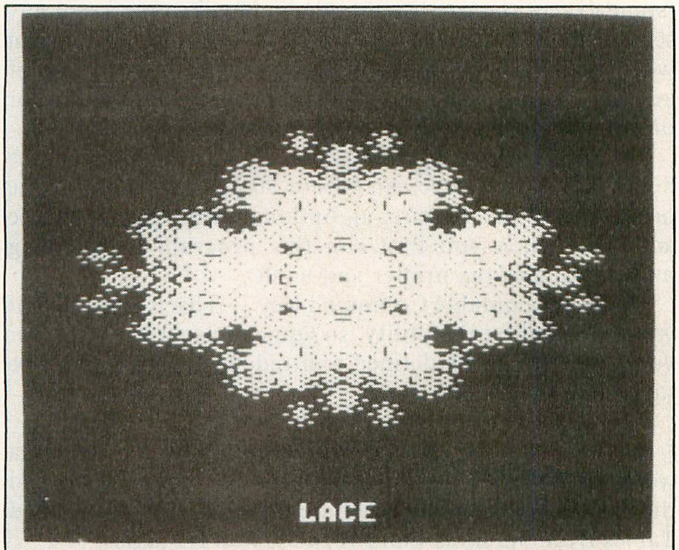
Art Gallery Displays Your Pictures With Style

If you are the type of computer buff who enjoys showing off your CoCo picture collection, *Art Gallery* will really add some pizazz to your show.

Art Gallery is a graphics utility for your 32K ECB Color Computer 1, 2 or 3 and requires one disk drive. The BASIC and machine language programs are not copy-protected, so back-up copies for your own use are not a problem.

Upon running `GALLERY`, a title page is displayed, prompting you to select in which `PMODE` you want to display your pictures. You can select 3 or 4, with a default of 4 when you press ENTER. You will then be asked which graphics screen you want. You can select 0 or 1, with a default of 1. Next, the program asks what extension is used to identify your pictures. You can choose `PIX`, `PIC` or whatever extension is used for the pictures on your disk. I should point out here that this program will not display *CoCo Max* or *Graphicom* pictures.



The program is written to read picture files that are four pages, or 6,144 bytes (6K) long. Details are provided in the one-page instruction sheet that explains how to re-save pictures that are non-standard or machine language generated and can be made to read OS-9 based pictures created with *Micro-Illustrator*.

After typing in the picture file extension, a second screen appears that allows you to choose from 11 special effects. It's nearly impossible to describe what each of these special effects does, so just take my word for it when I tell you that here is where the fun begins!

After making your selection, you are asked if you want to display one or all of the pictures on your disk. You are also asked how long you want each picture to be displayed in seconds. If you select 0 for all special effects and 5 for display time, then a combination of all the special effects will be used to display the number of pictures you chose.

I tried all of the options on several of my favorite picture disks and was delighted with the results. My favorites were the curtains, nested squares, mirror and slices. I guess I liked slices better than all of them. The picture appears in ever-widening bars, like looking through Venetian blinds as they gradually open. All of them are good and many reminded me of the special effects we see in commercial TV graphics productions. Several sample pictures are included on the disk to get you acquainted with the various features, but I found my own collection of digitized pictures to be the most interesting.

As with most any computer program, this one is not without flaws. I found two design problems with *Art Gallery*. The first was that when selecting the special effects, the choice is not displayed. This causes some minor confusion, since you are never quite sure if your selection was actually made. The second and more serious flaw occurs if you select only one picture to be displayed. After this selection is made and the picture is displayed, you are returned to the same submenu to select another single picture. I was unable to figure out how to get back to the main special effects menu without breaking out of the program and re-running it.

In spite of these two problems, *Art Gallery* is still a good program. On a scale of 1 to 5, I give this one a 4.

(Tothian Software, Inc., Box 669, Rimersburg, PA 16248; $19.95)

— Jerry Semones

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Super Programming Aid Enhances CoCo 3 Capabilities

By C.L. Pilipauskas

Here they come! The new CoCo 3 hasn't been out very long, but already programs are starting to show up. I had figured that with all the new graphics capabilities and increased speed, my first review for the CoCo 3 would be a game. To my surprise, I'm reviewing a utility — *Super Programming Aid.*

This utility was written for the CoCo 3 and takes advantage of some of its new capabilities. It is designed to aid the BASIC programmer by adding features not found on the CoCo 3. The version I received (Version III) is on disk and contains six programs. The first is a BASIC loader program (`SPA.BAS`), which can be customized and which loads the actual utility (`SPA.BIN`).

Also included are the default command table (`SPATBL.BIN`), a printer spooler (`SPL.BIN`), a command editing program (`SPAEDIT.BAS`), and a sample command table file (`SAMPLE.BIN`). This utility is not copy-protected and should be backed up before using.

The program is well-documented with a 33-page manual, and it explains the use of the program fairly well. The only major omission from the documentation is examples. This program is complex enough to warrant some, especially for the beginner programmer.

The functions of *Super Programming Aid* are activated by a series of keystrokes starting with the control key (CTRL) followed by another key or a shifted key. If you've ever used a computer or terminal that used the CTRL key for anything, you know it is used like the SHIFT key — press and hold while hitting another key. In this utility, the CTRL key is used as two separate key presses. Press and release the CTRL key, and then press and release the other key to activate the function.

Super Programming Aid includes the following features:

1) Auto Line Numbers — Automatically generates line numbers as you type in your BASIC program; you pick the starting number and the range. It has error-checking that prevents accidentally typing over existing lines.

2) Screen Editing — A line editor similar to the Extended BASIC line editor, with some additional features such as insert mode, overtype mode, delete, cursor movement by arrow keys and line number editing. When you press the keys to go to the end of the line, you don't go to the last character in the line but to the end of the BASIC line buffer. If only a few characters are in the BASIC line, the cursor ends up several blank lines away.

3) Keyboard Clicker — Creates a noise when a key is pressed; can be toggled on or off.

4) Suspend Command — Suspends (hides and protects) the current program in memory and allows you to load and edit, run another program or append the second program or file.

5) Copy Command — Screen editor function that non-destructively copies a chunk of the BASIC program elsewhere in the same program; does extensive error-checking to prevent overwriting existing codes.

6) Move Command — Another screen editor function. This is a destructive copy (deletes the original code after the move) and does the same error-checking as Copy Command.

7) Find Command — Searches for a string up to 17 characters long in the BASIC program in memory; allows for multiple search of the same string.

8) Program Terminate — "Unhooks" itself from BASIC in an orderly fashion and stops execution of the utility.

9) Scrolling Up or Down — Allows for line-by-line viewing of the program in memory.

10) Typ-O-Matic — Toggles on or off the auto-repeat of a key held down for more than half a second and continues until released.

11) BASIC Program Formatting — Reformats the way the BASIC program is listed by breaking up long statements into pieces determined by the ':' and printing each piece indented on a separate line.

12) Clear Key Disable — Turns the CLEAR key on or off to prevent accidental erasure of a line while it's being typed in.

13) Command Keys — Allows you to define any key (some exceptions are listed in the manual) to represent any sequence of keystrokes you want. This feature is an option when you start the utility. If chosen, it loads in a table of key definitions, either the default provided by the author or one you generate with the Command Editor Program.

14) Screen Print Command — Prints anything on the high resolution text screen (40- or 80-character) to the line printer. With this feature, an optional print spooler can be activated when you first run this program — allowing multitasking of the printer and BASIC.

15) Programmable Command Key — This is one key that is not defined by the utility, so you can use it for whatever you want. It can be defined and redefined, but it can't be saved like the others.

As you can see, *Super Programming Aid* provides a wealth of features. It is available for the older CoCos and the manual describes a procedure for converting Command Tables from Versions I and II to Version III tables.

To summarize a bit, this utility adds many features that could make life easier for a BASIC programmer. It provides outstanding error-checking to prevent you from accidentally doing anything destructive. The manual is extensive but might be a little confusing to the neophyte.

I was not able to discover any bugs or problems with this program while I was using it, and I tried! I feel adding key-repeat to the line editor and scrolling, putting more examples in the manual, and changing the editor to stop at the last character in the buffer could improve this program.

If you do a lot of BASIC programming, you should find *Super Programming Aid* helpful.

(Bangert Software Systems, P.O. Box 21056, Indianapolis, IN 46221; 317-262-8865, $29.95 plus $2 S/H)

Quotes: So-So News for Game Show Buffs

Aha! Caught you . . . . There you go, sneaking off to go watch game shows again. Come back for a second, will you? I'd like to talk with you about some new Color Computer software. It works on a 32K CoCo 1, 2 or 3 (in CoCo 2 mode) with a disk drive, and can really be loads of fun. What's that? You can't miss *Wheel of Fortune*? It's your favorite game show? Well, read on.

Quotes by B. Erickson Software is a game for one to eight players based on *The Wheel of Fortune*. Just pop the copy-protected disk in the drive and type `LOADM"QUOTES"`. Pretty soon, you and your friends will be buying vowels, guessing letters, and trying to figure out what the famous quote, saying, or proverb really is. But it's the wheel you'll have to watch out for. It can give you up to 5,000 points for a correct answer, depending on where it lands, or it can instantly make you bankrupt. After the wheel tells you your fate, you can either guess at a letter, buy a vowel with $100 of your hard-earned cash, or try to guess at the whole phrase.

Just in case you need to brush up on how to play, *Quotes* is accompanied by a well-written booklet that thoroughly explains the program.

Quotes has practically everything the TV show has, with the exception of a hostess to turn the letters. Oh, also, no prize boats or cars here. You do, however, have 256 quotes that will be randomly presented for your guessing pleasure. This should be enough to keep you busy for a while, but you may run into repeats more often as you keep playing. More quotes wouldn't hurt.

But, before all you *Wheel of Fortune* addicts go running to your checkbooks, let's balance the positive and negative sides of *Quotes*.

On the positive side, *Quotes* is a fun game, especially if you enjoy the game show. It is well thought-out, and bug-free. And, you can have all your friends over to gather 'round and play for an evening.

On the negative side, *Quotes* has no graphics, just text, and while this is formatted well, it isn't as visually enticing. Further, I found the game to get rather boring after playing for a while. Now, there are probably tons of *Wheel of Fortune* fans out there who would disagree, but I still feel that, while fun at first, the game gets tedious rather quickly.

Finally, *Quotes* is, in my estimation, overpriced for what it actually does. If the game had graphics or 1,000 quotes, I could easily see paying $25 for it, but not as it now stands.

Still, if you do like games such as this, I think you'll find *Quotes* a well-organized, well-written game. It really depends on whether this sort of thing is your cup of tea.

(B. Erickson Software, P.O. Box 11099, Chicago, IL 60611; 312-276-9712, $25)

— Eric W. Tilenius

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE

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CMOS Conversion Kit: The Chips Are Down

This product consists of two 40-pin chips wrapped in antistatic plastic. These are Hitachi HD63B21P and Hitachi 63B09EP chips. These two chips are accompanied by information and suggested circuitry on how to make your CoCo 3 "portable."

The first page of the instructions points out how much less power the 63B09E uses than does the 68B09E. It presents quite accurate electronic specs to document this. It also correctly points out that the 63B21 uses about $^{1}/_{12}$ the power of a 68B21. The documentation also correctly points out that the GIME chip in the CoCo 3 is a low-power CMOS chip that consumes far less power than the old SAM VDG combination in the older model CoCos. So far so good.

But then the instructions allege that if you replace your CoCo 3's 68B09E with their 63B09E and your 68B21 with their 63B21 you will have taken a significant step toward making your CoCo 3 portable. They provide a suggested circuit for running your CoCo 3 from a 12-volt battery pack.

However:

1) Both the 68B09E and the 68B21 on the CoCo 3 are soldered directly to the board. Removing and replacing 40-pin ICs without damaging the PC board is not a trivial matter, even if you are a skilled electronic service technician.

2) The amount of power consumption reduction afforded by the Conversion still amounts to only about a 20 percent total reduction in use by the CoCo 3.

3) Furthermore, their suggested circuit for running the CoCo from that battery uses a monolithic linear regulator to drop 12 volts to regulated 10 volts, then allow that 10 volts to be dropped to regulated 5 volts by the CoCo's inefficient on-board linear regulator circuitry. This is poor design in a "portable" unit, for such design throws away, as heat, over half of the available power in the battery pack. The right way to achieve portability is to use efficient switching power converters to produce regulated 5 volts, and feed that directly to the CoCo board.

4) You still need to use a monitor with your "portable" computer, and you still need to hook up a disk drive, and power that stuff in some way as well.

Finally, CMOS Conversions is asking $49.50 for the 63B09E chip and $19.50 for the 63B21 chip. I called my local Hitachi regional office, got the name of my local distributor, and they informed that the single quantity price of the 63B09E is $12.50, and the single quantity price of the 63B21 chip is $3.51.

In conclusion, this product consists of misinformation on power supply design applications and two overpriced Hitachi ICs.

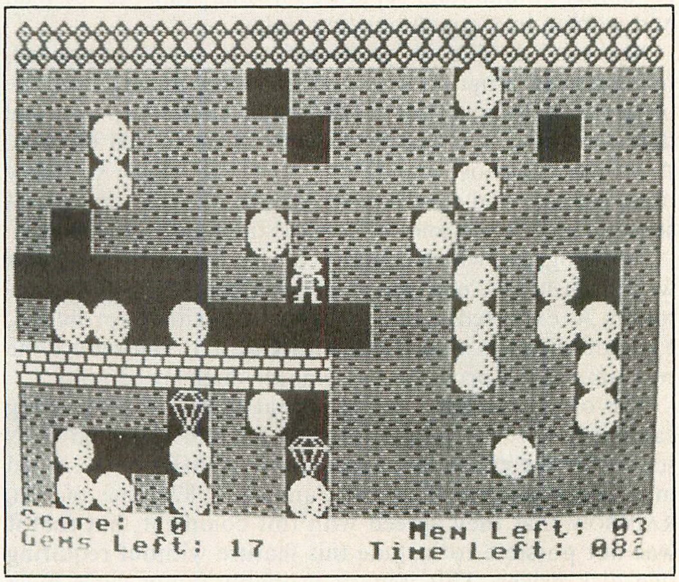
(CMOS Conversions, 480 Oakdale Road NE #3, Atlanta, GA 30307; 404-681-0581, 63B09E chip, $49.50; 63B21 chip, $19.50)

— Marty Goodman

Bouncing Boulders: A Gem of a Game

Bouncing Boulders is a funny, fast-paced arcade game for the 64K ECB Color Computer. A joystick is optional but highly recommended. The program is supplied on tape or disk and is copy-protected, but Diecom will replace it during the first year if problems arise.

After loading, the program executes automatically. A color test screen precedes the main title and score screen. Ten levels of play are incorporated, with each getting progressively more difficult.



```
Score: 10                 Men Left: 03
Gems Left: 17            Time Left: 082
```

The object of *Bouncing Boulders* is to move your man around the screen and collect all of the buried gems, then advance to the next and harder screen. When you have collected all of the gems on a particular screen, the screen flashes green and sounds a tone to signal you to go to the flashing exit square. If you fail to complete the screen within the allotted time, you lose a man and have to start over. Your time, men left, gems left and level of play are all displayed at the bottom of the screen.

I found this game to be highly entertaining and a lot of fun to play. The graphics and animation are excellent, especially the smooth movement of the boulders and gems as they fall. As you move your man through the red clay, you have to be careful when digging under or next to the boulders, which can fall on top of you. Since the boulders are round, they can also roll sideways and drop down in the open spaces that you created while digging. You can push the boulders out of your way by holding down the firebutton, but you can only push one boulder at a time.

You also encounter various alien creatures that hinder your progress, but you can destroy them by leading them under falling boulders. If you get caught by one of the aliens, you lose a man. There are other surprises as well that make the game even more fun. A nice feature is the ability to pause and gather your wits without being penalized. If you find yourself blocked, you can restart the screen but you sacrifice a man.

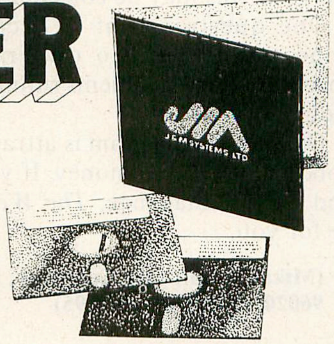
After you develop your skills enough to begin advancing to the harder screens, you can restart the game at the screen prior to the last one you completed. This is a good feature because it prevents the boredom of having to replay the easier screens each time. Disk users also get to add their names to the score page indicating the top 10 players.

So for a fun, fast, colorful and challenging experience, I recommend *Bouncing Boulders.* After digging around for a few hours, you soon understand why diamonds and other precious gems are so expensive. They're awfully hard and dangerous to mine!

(Diecom Products, 6715 Fifth Line, Milton, Ontario, Canada L9T 2X8; 416-878-8358, $28.95 plus $2 S/H)

— David Gerald

See You at RAINBOWfest-Chicago April 10-12



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The Word Search Game Supplies Tough Puzzles

The Word Search Game from Mikaron Software is a hidden word puzzle generator for the 64K Color Computer with a disk drive. It generates random puzzles covering many different subjects (e.g., animals, NFL teams, automobiles, etc.).

The program comes with a single sheet of instructions, which adequately explain program operation. It should be noted that onscreen instructions are also provided. Loading the program brings up a high resolution screen, which utilizes a very nice-looking character set. This same set is used for all program screen displays.

A menu for puzzle subject selection is first presented. Once you make a choice, the screen clears and a "wait" message appears while the program takes a couple of minutes to generate the puzzle. When the puzzle is displayed, the user locates the hidden word, then moves the cursor over each of the letters, pressing the space bar each time. When the word is completed on the puzzle, it is crossed off the master word list. Using the SHIFT-CLEAR combination brings up a command level menu, offering options for (G)ame, (H)elp, (P)rint, (M)ain menu and (Q)uit.

Up to five copies of the puzzle can be directed to a printer with an optional answer template. Baud rates of 600 or 1200 can be selected for printing.

The only fault I can find with the program is that the puzzles are in a 30 by 16 grid. This makes for a *very* challenging puzzle. If the user could generate smaller puzzles, the program would be more suitable for younger family members. Of course, for more advanced puzzle workers, this may be considered a plus.

One question that is becoming of more and more importance to CoCo owners today is compatibility. I encountered no problems running the program on either my CoCo 3 or CoCo 2.

Overall, the program is attractive and well done. It offers good value for the money. If you like word search puzzles and want a challenge, *The Word Search Game* could just be for you.

(Mikaron Software Company, P.O. Box 1064, Chester, CA 96020; Disk Only, $16.95)

— Leonard Hyre

Bowling League Secretary Revisited

In the September 1986 issue of THE RAINBOW, I reviewed a new software product, *Bowling League Secretary* by TOMELA*Co. This product is a specialized database that provides the record-keeping and calculations needed to maintain individual and team standings in a bowling league. Since that review, the author has issued an updated version of the program, Version 1.1. This version provides the capability to maintain separate bowling statistics for men and women in a mixed bowling league.

Version 1.1, like its predecessor, is a well-organized, menu-driven program with very good documentation. The program is designed for a 32K Color Computer with one disk drive and will handle a league of up to 200 bowlers. A printer is almost mandatory, since the league secretary must prepare and post reports showing weekly scores and summaries of team and individual standings in the league.

The program, which actually consists of several programs written in BASIC, performed as described in the documentation. As expected, it ran on my CoCo 3 without problems. I should mention that those with CoCo 3s can reduce the sort time of the program by using the high speed poke.

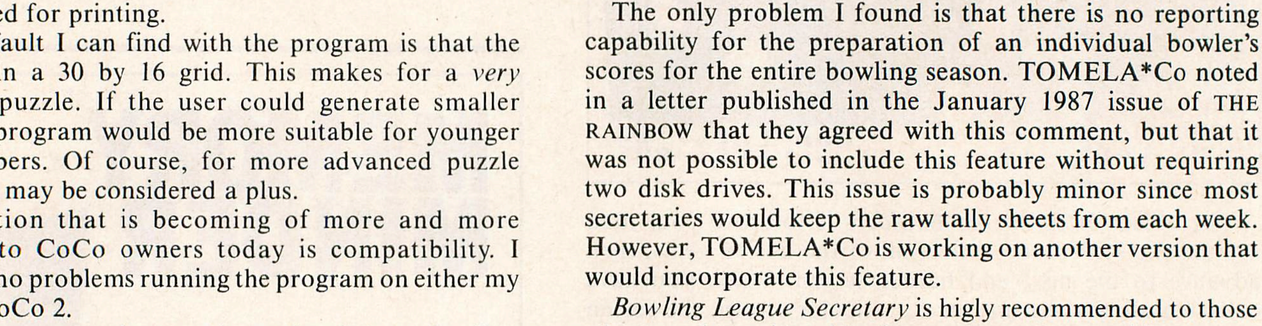
The only problem I found is that there is no reporting capability for the preparation of an individual bowler's scores for the entire bowling season. TOMELA*Co noted in a letter published in the January 1987 issue of THE RAINBOW that they agreed with this comment, but that it was not possible to include this feature without requiring two disk drives. This issue is probably minor since most secretaries would keep the raw tally sheets from each week. However, TOMELA*Co is working on another version that would incorporate this feature.

Bowling League Secretary is higly recommended to those who spend considerable time each week compiling league bowling scores. TOMELA*Co is to be congratulated for submitting updated versions of their program.

(TOMELA*Co, P.O. Box 2162, Doylestown, PA 18901; $49.95)

— Donald D. Dollberg

CoCo Cat


GATE 5
GATE 6
RAINBOWfest OR BUST!
WELL, WE DO HAVE ONE CHEAP SEAT LEFT.
I WONDER IF THERE'S A CHOICE OF ENTREES?
H.M.

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Victory
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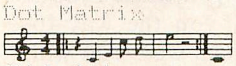
BABY TEETH LG.
BOBO BOLD
BOOKS
Cartwheel
Fine Print
Normande Small
Normande Medium
NORMANDE LG.
Plano
SINALOA
sukiyaki

SET 2

BLOCK UP
Harlow
Koloss
maharajah
MUSKEGO
Peignot Small
Peignot Large
PROGRAM SMALL
PROGRAM MEDIUM
PROGRAM LARGE
ROCK&ROLL
Futura Black Small
FUTURA BLK. LG
HANG UP
KEYBOARD
LIQUID CRYSTAL
Мосцоя Смалл
Мосцоя Ларге
ORBIT
POINT OUT
Printout Small
PRINTOUT LARGE
STOP

SET 3

BANNER
Bocklin
Broadway
BROADWAY ENGR.
Dot Matrix

Old English
PIONEER
URBAN
Xerxes Small
XERXES MEDIUM
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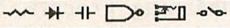
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[illegible]

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Communicate Effectively With Rules of Writing

When we want to communicate an idea to a large number of people, we need to be able to write effectively. One of the ways we can learn how to do this is to use the self-development course that is available from compass education. This software is only available on cassette tape, as all of the programs contain both audio and visual presentations of the material. It's designed to run on your CoCo 1, 2 or 3.

Volume One of Rules of Writing deals with writing effectively, logic in writing, developing simple and complex sentences, paragraphs and diction. Volume Two continues with parts of speech, punctuation and spelling, as well as writing letters, reports and papers.

At one time or another, everyone needs to put his thoughts into writing. The student needs to write term papers or book reports. Adults might need to write reports about their jobs. To do this effectively, you must follow certain rules. These study courses show you the way to arrange your thoughts and ideas in a logical way. You will also see how to write these thoughts down.

The other night we had a friend over who is a computer teacher at a local elementary school. I was telling her about this course of software I have been reviewing. Linda was very interested in seeing how it worked, so we went to CoCo, and put on the Rules of Writing study course.

Linda was particularly impressed with the audio portion of the programs. She felt that this would indeed aid in the students' learning process. She felt, as I do, that the programs are set up in a logical and well-presented format. At the end of each lesson plan, you are shown a scoreboard that shows the number of questions asked, the number answered right on the first try, and the number of wrong answers.

If you do a great deal of writing, or you just want to be able to write a good letter, then these programs should be useful to you.

(York 10 Software, 9525 Vassar Avenue, Chatsworth, CA 91311; 818-700-0330, $49.95 per two-volume set plus S/H)

— John H. Appel

Hint . . .

Hex of a Good Conversion

Keep in mind that converting from hexadecimal to decimal and vice versa is simple if you let your CoCo do the work. To convert from Hex to decimal, just enter `PRINT &H`*xxxx* where *xxxx* is any Hex number up to four digits.

To go from decimal to Hex, enter `PRINT HEX$` `(`*decimal number*`)`. You must use parentheses here. On the CoCo 3 you can also convert an octal number to decimal by entering `PRINT &O`*xxxx* just as you did for the Hex conversion above.

H. D. Cooke
Wilmington, VT

Get More From Your Keyboard With *FKEYS III*

FKEYS III Version 1.0 is a handy utility for all models of the Color Computer with at least 64K RAM. It provides a method to program various keys for special or repetitive functions.

The program, supplied on disk, is not copy-protected, so back-up copies are not a problem. *FKEYS III* runs in the all-RAM mode, which is auto-loaded when first running the program. The program is very easy to use and is menu-driven. Upon running `MENU`, the user is presented with these options: Configure New FKEYS, Load Custom FKEYS, Accept Default FKEYS, Disable FKEYS and DOS Modifications.

Configure New FKEYS, Option 1, allows you to set up the keys of your choice to provide whatever function you want. It also allows you to choose either the CONTROL key if you have one on your keyboard or the down arrow if you don't.

Option 2, Load Custom FKEYS, allows you to load in the custom function keys that you have previously saved on the disk. Option 3, Accept Default Keys, will load in the default function keys.

Keep in mind that you can change any of the functions using Option 1. All CoCos using the new style keyboards with F1 and F2 keys can have 20 functions. By using the down arrow as a control key on older style keyboards, the user can define 18 functions.

Option 4 disables the function keys.

DOS Modifications, Option 5, allows you to modify DOS for single- or double-sided drives and 35- or 40-track, and to change the track access speed from 6 to 30 ms.

Another nice feature of *FKEYS III* is that the entire modified DOS from `&HC000` to `&HDFFF` can be saved to disk and then used to burn an EPROM if you would like all of the special functions available at power-up. A special touch, I thought, was the ability to send a list of what each function key does to your printer. This is especially helpful if you have different functions programmed for different applications.

The menu options coupled with the ability to save custom versions of *FKEYS III* provides a lot of versatility since you can have many versions available for different programming or operating circumstances.

I like *FKEYS III*. It provides a useful function and can result in significant time savings, especially in programming. You could program different keys for often repeated statements and commands like `GOTO`, `GOSUB`, `FOR`, `NEXT`, `PRINT #-2`, `SAVE`, `LOAD`, etc.

The price of *FKEYS III* is reasonable, and the documentation is sufficient to provide easy operation right out of the package. So, if you are looking for a quick and easy way to put those new F1 and F2 keys to work on your CoCo, then I recommend you consider *FKEYS III*.

(Spectrum Projects Inc., P.O. Box 264, Howard Beach, NY 11414; 718-835-1344 $24.95 plus $3 S/H)

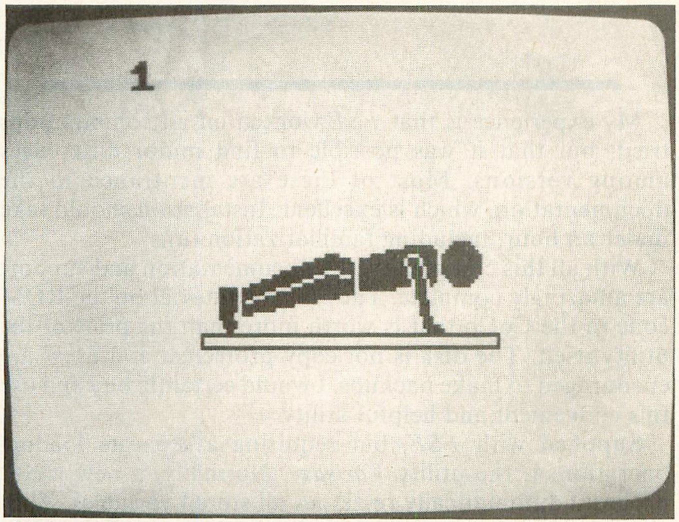
— Jerry Semones

Get in Shape With *CoCoSize*

It's easy to start an exercise program. Just ask me; I've started dozens of them! Obviously, the trick is to stay on a program. Support groups (such as classes at a gym) are great. Arranging to participate in a regular program in your home with a friend or spouse can also help. Unfortunately, those options aren't right for everyone, and just plunging in on your own can be tough. CoCo to the rescue!

CoCoSize from Kromico Software can be your exercise partner. This program, on disk with no copy protection, creates a graphic representation of a person who performs any of six different exercises while you follow along. Jane Fonda it ain't, but the representation is certainly accurate enough to portray the suggested exercise. The exercises available include jumping jacks, push-ups, sit-ups, chin-ups, toe touches and running in place.

Upon selecting one of these from the main menu, the user is prompted for the number of repetitions (10-99) and the pace (slow, medium or fast). Following the selection, time is allowed for the user to get to the exercise area and assume the position before CoCo begins.



The other choices from the main menu include Create Workout and Do Workout. The user can create and name a workout file, including any or all of the six exercises, in any order, for a chosen number of repetitions at a chosen pace. A quick workout, for when you're pressed for time, could be programmed and named `SUEQUICK`. A more thorough workout could be programmed and named `SUEHARD`. A workout file including all six exercises uses only one granule of disk space. With 28 free granules on the program disk, there should be plenty of space for everyone in the family to have several custom exercise programs. The Do Workout option displays a menu of all of the workout files.

A minor weakness of *CoCoSize* is the documentation. There are 11 screens of instruction displayed by the program (if requested), none of which is included as hard copy. Most of these screens are the "press any key to continue" variety, but two of the screens are displayed for an interval determined by the program. These two screens pertain to "create" and "do." The instructions for "create" are a bit vague, and neither screen is displayed long enough for my liking. I understand that the instructions in this area have been revised for a subsequent version of *CoCoSize*, so this may be solved.

> ***"A workout file including all six exercises uses only one granule of disk space."***

Admittedly, *CoCoSize* is easy to use once you figure out how. Unless you have a better memory than I, however, you'll find yourself wanting to review the instructions at some point. After the instructions have been viewed initially and the actual program is underway, the only way to return to the instructions is to exit to BASIC and start all over.

When entering number of repetitions and pace for each exercise to create a workout, the values entered are not displayed. This is inconvenient when putting together a complicated workout and I would expect this bug to be remedied in subsequent versions.

CoCoSize works well and is a real bargain. I recommend it to anyone wanting to use the CoCo for less sedentary activities.

(Kromico Software, 708 Michigan Ave., Sheboygan, WI 53081, $9.95)

— Stanley Townsend

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Software Review

Full Screen Editor & Varisave: Convenience and Flexibility

Some people may be afraid to tackle a utility with the complexity and flexibility of this one, but such users normally do not do enough of their own programming to need the *Full Screen Editor & Varisave* (*FSE* for short).

What does the *FSE* really do? It is primarily intended to provide the BASIC programmer with a word processor-like ability to move around the screen while correcting programming errors as they are found, rather than correcting them line by line. Along the way, this approach has also provided the ability to copy program lines, move or combine them, locally renumber them and perform many other editing functions.

"So what?" you say, "I have the EDIT command in Extended Color BASIC, and I own three other screen editors making similar claims. I never use any of them because they are all inconvenient, or take too much memory, or . . . ." Well, this one will probably get used because it works, takes *no* memory and is user-tolerant. Furthermore, the documentation fully explains what is being done and why.

FSE requires 64K and Extended Color BASIC. The program requires 64K because it rewrites the ROM code (that is also how it does its job without using memory). This means it is intended to be EPROMed and thus loads normally at power-up as a self-booting portion of your system. I used it instead as a normal utility off disk and found that satisfactory. It should work also from tape systems.

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Vernon Nemitz's *Full Screen Editor & Varisave* claimed compatibility with all Color Computer variants. I tested it on an old 'F' Board, two CoCo 2s of different vintages, a CoCo 3, and two other machines. Because of the number of options in *FSE*, I never completed all options on any one machine, but probably tried all major options "somewhere."

The utility was quite reliable and reasonably bug-free. You could, however, put one or more options temporarily out of business by trying them on an odd combination of non-standard DOS/ROM mixtures, or by trying to combine *FSE* with other software that uses undocumented ROM calls.

> ***"With all this complexity, the documentation and support are amazingly complete."***

My experience is that *FSE* worked on all combinations tried, but that it was possible to find minor differences among versions. Most of these are mentioned in the documentation, which is excellent. Installation should take under an hour, including familiarization runs.

With all this complexity, the documentation and support are amazingly complete. They form a tutorial on the ROM code in the CoCo that is worth more than the price of the utility itself. The disk is not copy-protected, and users are encouraged to make backups. I would certainly buy and use this convenient and helpful utility.

Supplied with *FSE*, but requiring a separate loading operation, is the utility *Varisave*. Normally, a new BASIC program automatically re-zeroes all stored variables. With *Varisave*, you can selectively clear only part of memory, enabling easy transfer of variable names and their related string and/or numeric data. The CLEAR command is redefined to perform this function selectively. *Varisave* does take a small amount of memory, and improper loading of it will crash the computer, so decide on its use before your session starts. (This point is well stressed and explained in the manual.)

FSE also includes a redefined and improved TRON command, error-trapping similar to that built into the CoCo 3, the ability to generate any CoCo semi-graphics symbol and/or any BASIC tokenized word with only two keystrokes, and a new command — Into. Into allows a mixture of direct command and normal run modes, enabling the computer to perform self-editing. There are other options as well — but buy it and see them for yourself.

(Warren & Associates, P.O. Box 5120, Virginia Beach, VA 23455; 804-456-1589, $25 plus $1.50 S/H)

— H. Larry Elman

Control Program Access With *Filesafe*

Filesafe is a program that deserves attention. It's a machine language program that will protect any standard RS-DOS disk file, including BASIC programs, word processor and data files. It will run on any 64K or 32K Color Computer, including the new CoCo 3, using Disk BASIC 1.0 or 1.1.

While most of us are somewhat familiar with file protection schemes using passwords to encode and decode the files, this one has a unique feature. Your copy of *Filesafe* encodes differently from any other copy of the program. What this means is that even if someone else has your password they cannot decode your protected file unless they are using your copy of the program. So as long as you control your personal copy of the program you can control who has access to your files.

Filesafe is not copy-protected. You are urged to make a back-up copy for your own protection. Because of the structure of the program, you must use *only* the standard RS-DOS `BACKUP` and `COPY` commands. The documentation consists of a nicely typed 10-page instruction manual in a clear plastic folder. I found the instructions easy to understand and follow.

Running the program is simple. Just type `LOADM "FILESAFE"` and execute. A copyright notice appears and a prompt is presented to select the drive you want to work with. Then press any key to start the program that reads the directory of the disk you selected. A menu page appears next, which provides the various program options. Up and down arrows are used to scroll the directory to select the file you want to encode or decode. You can also perform other functions using the following commands:

I — File Information. Displays the name and extension of the file you have selected. It also tells you the file type such as data, BASIC, machine code, etc. The file format is displayed and shown as binary or ASCII. The program length in granules and the encryption status are displayed.

E — Encode File. You are asked twice as to your intent to encode the file you have selected. Next you enter a password of one to 16 characters including spaces. You are warned to write down your password so you don't forget it. The file is then encrypted and the extension `ENC` replaces the original extension.

D — Decode File. This is just the opposite of Encode File with one exception. If you do not enter the correct password, the file will be destroyed.

P — Purge File. Similar to `KILL` in RS-DOS except all of the file is erased; not just the directory filename.

R — Read Dir. Reads the disk directory in the drive selected.

S — Show File. If the file has been encrypted, or is in machine language, you can't see anything. If the file is BASIC or ASCII and not encrypted, it will be displayed on the screen.

Q — Quit Program. Exits *Filesafe* and does a cold start.

C — Change drive. You can select which disk drive you are using.

I found *Filesafe* to be very easy to use and user-friendly. I tried it on several programs and it performed as discussed in the instruction manual. Looking at encrypted files with a disk zapper or word processor resulted in only garbage on the screen. It has a lot of potential for those CoCo users who want total protection of their computer programs and files. While such protection is afforded by this program, you must exercise a great deal of caution since incorrect passwords not only deny entry into the program but *destroy it as well.*

The program's author, John Gallagher, has done a nice job on *Filesafe* and its documentation. A 30-day replacement warranty is offered and the price is right for what it does.

(Emerald Island Software, P.O. Box 11126, Cleveland, OH 44111; $22 plus $2 S/H)

— David Gerald

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<<<GIMMESOFT>>>

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Learn the Fundamentals With *Introductory Spanish Courses*

For years I have been reading about quick and easy ways to learn a foreign language, usually using a set of tapes. If those ads were really true, it would put me out of my job as a high school Spanish teacher. But there is nothing quick, and certainly nothing easy about learning a foreign language. Analogies to learning a computer language are only partially valid; computer languages seldom have exceptions, 50,000 word vocabularies, emotional content, or listening and speaking aspects. In light of the difficulty of learning a foreign language by yourself, how well does a new set of programs from Dorsett Educational Systems called *Introductory Spanish Courses* do?

These programs come as eight cassette tapes, recorded on both sides, in a 5-by-7 inch plastic package. It is available only as a cassette program and *will not work with anything plugged into the expansion port.*

A machine language "monitor" program must be loaded from either Tape 1 or Tape 9 before any program can be used. Once it is loaded, typing `EXEC` begins the program. All characters and illustrations are done on the graphics screen.

Although the character size allows the same 32 letters by 16 lines on the screen, they seem larger by virtue of their shape, light-on-dark presentation, and skillfully laid out screen arrangements. The background screen is black and the letters are white, with underlining and drawings in various colors. The screens are equally visible on a monochrome monitor, so equipment necessary to use this program is minimal.

If you know anything about "programmed instruction" (no reference to computer programming here), then you understand the method in these tapes. After loading and executing the program, you leave the cassette player on "play." Real voice narration is supplied by the tape, playing through the television.

Text and illustrations are also fed throughout the program by the cassette tape. The documentation suggests setting the monitor at a volume level of 7, which is high. This is good advice. Turn it high and leave it high. If, at any time, you can hear the machine coding through the speaker, it is not being loaded properly. When it happened to me, it was solved by turning the volume up on the cassette recorder.

Explanations are given, illustrations are shown on the screen, then an answer is requested from the keyboard. If the answer is right, the narrator tells you so, and the lesson continues. If your answer is wrong, you hear an annoying tone, the screen clears, and the correct answer appears, sometimes with a short explanation.

Any key returns you to the prompt screen, with your old answer still sitting there for you to correct. The answers are either multiple choice or fill in the blank. The lesson continues until the end of the tape, when a scoring screen displays the number of questions presented, the number of correct answers on the first try, and the number of questions missed.

Having gone through all 16 sides of the eight tapes, I can vouch for the accuracy of the explanations and text, and for the quality of the pronunciation. A woman's voice offers the explanations. A man's voice speaks the Spanish words and phrases. I find it valuable to highlight the Spanish by presenting it in a different voice. It also offers the student a chance to hear Spanish from both a male and a female voice, since the narrator uses Spanish in her explanations.

The lessons presented cover the basics of a first-year Spanish course and offer, according to the ad, a vocabulary of 250 words. This series is not for younger children, however, for two reasons. The explanations are not simplified. Such phrases as "in an exclamatory fashion" and "affirmatively" are used. And the material is presented at a pace that requires the attention of a serious student.

This program addresses three of the four skills involved in language learning: reading, writing and listening. Except for some minor program bugs, I think it does so accurately and effectively. While this would be a very good way to begin independent language study or brush up on a past Spanish course, I immediately thought of using it on my students who have missed or failed to learn particular grammar points or specific verb conjugations.

I found five or six problems, but none of them seriously hamper the program. In one case, the wrong word is underlined. In another, the letter 'S' appears as '9' in a word. The most serious bug is one spot when two lines must be completed for an answer. Advancing from one line to the next is normally done by pressing `ENTER`. On one screen, however, only pressing `BREAK`, then another key, would allow the program to continue, picking it up on the next screen. In spite of these flaws, I heartily recommend this set of tapes for anyone who wants to get a foundation in understanding Spanish, supplement classroom instruction on the first-year level, or review the fundamentals.

The only recommendations I have for Dorsett are to make a companion booklet available, as well as a detailed list of contents for each tape. Since the tapes are linear, i.e., they are used straight through, there is no going back to find a word or verb form that was covered previously.

A booklet that reiterates the material would be very helpful. A list of tape contents is needed to guide anyone wanting to use the tapes for review of specific items. I have hopes that these will soon be available, since many of the other programs that Dorsett offers, from math to language arts, do have study guides.

(Dorsett Educational Systems, Inc., P.O. Box 1226, Norman, OK 73070; 800-654-3871, $99)

— Dennis Church

POLICE OFFICERS and others

If you are involved in the reconstruction of motor vehicle accidents or would like to learn, this program is a must. The program is extremely user friendly. It allows you to enter just your road measurements. The computer will give you the speed of each vehicle at the point of impact. Answers output to screen or printer. Complete instructions for the beginner. This program is written for a 64K COCO ECB disc. It is easily adaptable to other RADIO SHACK computers. Order **RECON** today.

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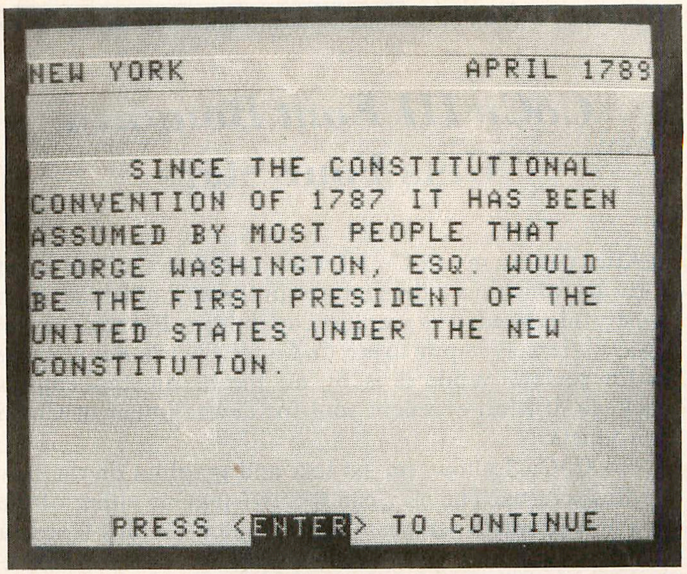
See if You Agree With *The Presidential Decisions of George Washington*

It's a tough job being president, but someone's got to do it. *Presidential Decisions of George Washington*, by B5 Software, gives you the chance to become the "Father of Our Country" without leaving your own home. The game is an educational Simulation intended for grades 7 through adult. It requires a Tandy Color Computer with 32K, Extended Color BASIC, and one disk drive. The package comes with one disk and a small nine-page manual. The instructions are also included as part of the game, so the manual is not really necessary.

During the game you are presented with 10 problems that President Washington had to resolve during his term of office. You are allowed to ask the advice of other people who lived during the time, reflect on the past, or obtain information on the overall effect of the problem. You may do this four to six times before making your decision. You are then presented with four decisions and must choose one.

The object of the Simulation is to make the same decision George Washington did when he was president. If your decision does not match President Washington's, the actual decision made is then displayed with an explanation as to why that particular decision was made. You are then asked if you want to continue with the remaining problems.

When you are finished, you may request a summary and score to see where you stand in making presidential decisions. Your answer and Mr. Washington's answer are both displayed for each problem presented. The answers are compared and rated on a scale of 0 to 50. An overall rating is provided along with your percent of correct decisions.



```
NEW YORK                    APRIL 1789

     SINCE THE CONSTITUTIONAL
CONVENTION OF 1787 IT HAS BEEN
ASSUMED BY MOST PEOPLE THAT
GEORGE WASHINGTON, ESQ. WOULD
BE THE FIRST PRESIDENT OF THE
UNITED STATES UNDER THE NEW
CONSTITUTION.

    PRESS <ENTER> TO CONTINUE
```

This Simulation is intended to be used as a supplement to classroom work when studying this particular period of history. Several suggestions are provided to aid in the use of the game. After playing awhile you can become hooked on this method of supplementing classroom instructions.

Overall, *Presidential Decisions of George Washington* is well done. It would be a good addition to your history lesson.

(B5 Software Co., 1024 Bainbridge Place, Columbus, OH 43228; 614-276-2752, $31.95)

— Larry Birkenfeld

Hint . . .

A Cure for the Stutters

If your new CoCo 3, or your older Color Computer, doesn't "talk" to your printer in anything better than a stutter at higher baud rates, try increasing the line delay. The memory locations you should use are 151 and 152. Just enter `POKE151,x:POKE152,y` where *x* and *y* are from the following table:

X	Y	Line Delay
64	0	.288 seconds
128	0	.576 seconds
255	255	1.15 seconds

Other values should work, as well.

Bernie Besherse
Ketchikan, AL

Hint . . .

The Place for Fun

Following are some interesting addresses on the CoCo 3. The addresses are the entry points to the indicated routines. So, boot up *EDTASM* and have some fun!

Address	Function
$F636	WIDTH
$E688	HSCREEN
$E6CF	HCLS
$E5F0	PALETTE
$E545	LPOKE
$E6F4	HCOLOR

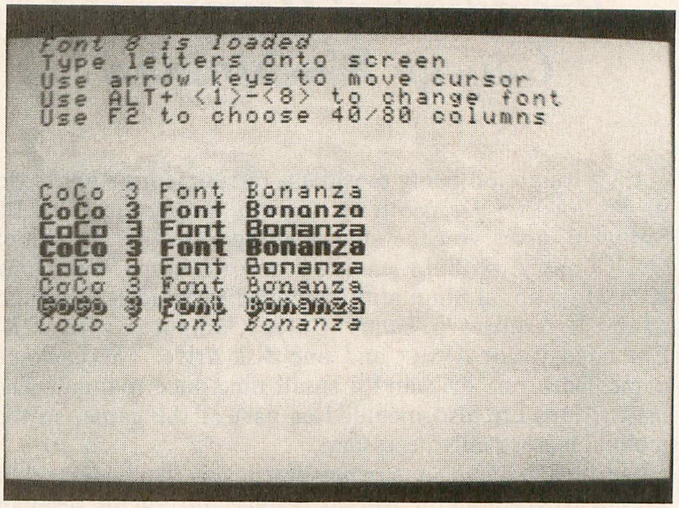
Marc Gagnon
Cap-Madeleine, Quebec

CoCo III Font Bonanza Gets Four Stars

After getting my CoCo 3 I was somewhat anxious to get software which used the features in the new machine. I am mostly interested in its graphics capabilities. For this reason, I was extremely happy to see *CoCo III Font Bonanza* come in for review. While it is by no means an applications package, it is an excellent tool for development of CoCo 3 products.

The CoCo 3 allows mixed text and graphics on the new Hi-Res screens. The user can `HPRINT` text on either of the two new graphics screens. The font used for this text is a standard font, which is located in RAM. Because it is RAM-based, this font may be altered, saved to disk and reloaded. This is how the *Font Bonanza* works. You can use the modifier to alter a character set or font in memory and then save it to disk for future loading. The font modifier is very easy to use. With a few simple keystrokes, you, too, can create your own CoCo 3 fonts.

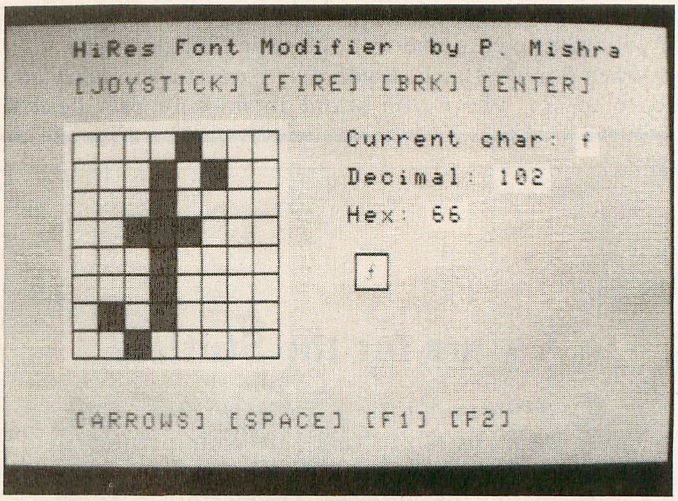
CoCo III Font Bonanza also includes several different fonts and a demo program which illustrates how to use the fonts. The fonts are designed to fit both the 40-column Hi-Res graphics screen (320 by 192) and the 80-column graphics screen (640 by 192). All that is necessary to use a given font is to load it from disk, issue BASIC commands for the desired graphics screen and then `HPRINT` the text to the screen. If you want to change between several different fonts regularly throughout a program, the *Font Bonanza* will accommodate you. Included on the disk is a program called *Multplex.* This BASIC program allows you to squeeze up to eight fonts into one file. Then, you can switch between the fonts quickly, without having to load each one from disk separately.



```
Font 8 is loaded
Type letters onto screen
Use arrow keys to move cursor
Use ALT+ <1>-<8> to change font
Use F2 to choose 40/80 columns


CoCo 3 Font Bonanza
CoCo 3 Font Bonanza
CoCo 3 Font Bonanza
CoCo 3 Font Bonanza
CoCo 3 Font Bonanza
CoCo 3 Font Bonanza
CoCo 3 Font Bonanza
CoCo 3 Font Bonanza
```

I must clarify one point. The RAM-based memory font which the *Font Bonanza* is used for, is only accessible from the new Hi-Res graphics modes of the CoCo 3. The font used for the Hi-Res text screens (40- or 80-column) is not affected by this series of programs. In other words, you can not type in BASIC listings while using one of the special fonts. This is because the Hi-Res graphics and Hi-Res text screens are totally separate.



```
HiRes Font Modifier   by P. Mishra
[JOYSTICK] [FIRE] [BRK] [ENTER]

                    Current char: f
                    Decimal: 102
                    Hex: 66

[ARROWS] [SPACE] [F1] [F2]
```

All in all, I found *CoCo III Font Bonanza* very enjoyable and easy to use. The documentation is more than adequate, and the program does exactly what it claims to do. It is easy to see where we might be seeing several programs in the future which utilize fonts created with this package. *CoCo III Font Bonanza* gets a four-star rating.

(Spectrum Projects, Inc., P.O. Box 264, Howard Beach, NY 11414; 718-835-1344, $28.95 plus $3 S/H)

— Cray Augsburg

One-Liner Contest Winner . . .

This little beauty will calculate your grade percentage based on number of classes, credit hours and grade percentage for the individual classes. Don't blame us, however, if you don't like the results.

The listing:

```
1 CLS:INPUT"# OF CLASSES THIS SE
METER";X:FORI=1TOX:PRINT"ENTER G
RADE & CREDIT HOURS FOR  CLASS #
";I;:INPUTG,H:A=G*H:TA=TA+A:TH=T
H+H:NEXT:PRINT"YOUR G.P.A. FOR T
HIS SEMESTER IS ";TA/TH
```

Anthony Frerking
Independence, MO

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape.*)

* * *

Clubs, Clubs, Clubs

We compile a list quarterly of Color Computer Clubs because of the many requests we receive. CoCo Clubs may wish to exchange newsletters, share ideas for topics of discussion at monthly meetings, etc.

Please let us know if we have omitted any clubs and send us complete up-to-date addresses. Only those clubs that have signed our anti-piracy agreement form will appear in this listing of CoCo Clubs. Also, please notify us if you wish to add or delete any names on this list. Send your information to:

CoCo Clubs
THE RAINBOW
The Falsoft Building
P.O. Box 385
Prospect, KY 40059

* * *

ARIZONA

Tucson Color Computer Club, Bill Nunn, 9631 E. Stella, Tucson, 85730, (602) 721-1085

CALIFORNIA

Color America Users Group, Mark Randall, 2227 Canyon Road, Arcadia, 91006, (818) 355-6111

Los Angeles-Wilshire Color Computer Users' Group, Norm Wolfe, P.O. Box 11151, Beverly Hills, 90213, (213) 838-4293

United Computer Federation, (San Fernando Valley Chapter and Headquarters), Pete Ellison, 366 West Providencia Ave., Burbank, 91506, (818) 840-8902

United Computer Federation, (San Francisco Chapter), Art Murray, P.O. Box 7007, Redwood City, 94063, (415) 366-4560, BBS (415) 364-2658

United Computer Federation, (Los Angeles Chapter), Gary James, 4147 Faculty Avenue, Long Beach, 90808

United Computer Federation, (Orange County Chapter), Fred Wright, 10112 Melody Park Drive, Garden Grove, 92640

The Davis CoCoNuts, Shneor Sherman, 1818 Haussler Dr., Davis, 95616, (916) 758-3195

South Bay Color Computer Club, Patricia Scheffer, 1435 W. 172nd Street, Gardena, 90247, (213) 371-2016

South Bay Color Computer Club, Bill Tillerson, 73 Alamitos Ave., Suite 2, Long Beach, 90802, (213) 432-3037

Ventura County Color Computer Club (VC4), Doug McLaughlin, Oxnard Public Library, 214 South "C" Street, Oxnard, 93030, (805) 984-4636 or BBS (805) 484-5491

Citrus Color Computer Club, Jack Brinker, P.O. Box 6991, San Bernadino, 92412, (714) 824-1866

South Bay Color Computer Users Group, John G. Say, 3117 Balmoral Drive, San Jose, 95132, (408) 923-2967

COLORADO

Colorado Color Computer Club, Lloyd Carroll, 6651 Bellaire Street, Commerce City, 80022, (303) 288-6369

The ESCO Computer Club, David E. Schulz, 1299 Harrison Street, Denver, 80206, (303) 388-6988

CONNECTICUT

The Southeast Connecticut Color Computer Users Group, Bill Gross, 30 Sycamore Lane, Groton, 06340, (203) 448-1388

DISTRICT OF COLUMBIA

Northern Virginia C.C. Club, Bruce Warner, 14503 Fullerton Rd., Dale City, Virginia 22193, (703) 690-2453

FLORIDA

Color Computer Club of Brandon, Richard Steinbrueck, 2913 John Moore Road, Brandon, 33511, (813) 681-1526

Northwest Florida CoCo Nuts, Lee Gottcher, P.O. Box 1032, Fort Walton Beach, 32549, (904) 678-8894

Alachua County Color Computer Club, Robert J. Lake, 2929 N.E. 12th Street, Gainesville, 32609, (904) 378-1993

Jacksonville Color Computer Club, William H. Brown III, 2411 Hirsch Ave., Jacksonville, 32216, (904) 721-0282

CoCo Chips Color Computer Club, 715 5th Avenue NE, Largo, 33540, (813) 581-7779

Broward County Color Computer Club, George Aloia, 2263 N.W. 65 Avenue, Margate, 33063, (305) 972-0975

South Brevard Color Computer Club, Benjamin S. Jerome, 496 Hillside Court, Melbourne, 32935, (305) 259-4609

CoCo Nuts of Central Florida, George Ellenburg, Box 593790, Orlando, 32859-3790, (305) 855-7867

Color-6809 Users Group, Emery Mandel, 4301 11th Avenue North, St. Petersburg, 33713-5207, (813) 323-3570, BBS (813) 321-0397

C.C. Club of Sarasota, Ernie Bontrager, 4047 Bee Ridge Rd., Sarasota, 33583, (813) 921-7510

GEORGIA

The Northeast Atlanta Color Computer Club, Joe Novosel, P.O. Box 450915, Atlanta, 30345, (404) 921-7418

The CoCo Cartel, Dennis M. Weldy, 4059 Acacia Drive, Columbus, 31904, (404) 576-5479

Atlanta Color Computer Users Group, Terry E. Love, 5155 Maroney Mill Rd., Douglasville, 30134, (404) 949-5356

ILLINOIS

Illinois Color Computer Club of Elgin, Tony Podraza, 119 Adobe Circle, Carpentersville, 60110, (312) 428-3576

Northern Illinois Color Computer Club, Kenneth Trenchard, Sr., 6145 N. Sheridan Road 30, Chicago, 60660, (312) 973-5208

Willow-Works Club, Kevin L. Adair, 5753 S. Laflin, Chicago, 60636, (312) 737-5716

Peoria Color Computer Club, Harold E. Brazee, 102 Twin Oak Court, East Peoria, 61611, (309) 694-4703

Glenside Color Computer Club, Ed Hathaway, 8 W. Stevenson Drive, Glendale Heights, 60139, (312) 462-0694

Kitchen Table Color Computer Group, Robert Mills, P.O. Box 464, Hanover, 61041, (815) 591-3377

Motorola Microcomputer Club, Steve Adler, 1301 Algonquin Rd., Schaumburg, 60196, (312) 576-3044

Chicago OS-9 Users Group, John Chasteen, 480 Gilbert Drive, Wood Dale, 60191, (312) 860-2580

INDIANA

Three Rivers Color Computer Club, R.R. 3, Box 269, Angola, 46703

CoCo Program Exchange, Erik Merz, 3307 Arrow Wood Dr., Fort Wayne, 46815, (219) 749-0294

Indy Color Computer Club, Kevin S. Jessup, Sr., P.O. Box 26521, Indianapolis, 46236, (317) 873-5808

Southern Indiana Computer Club, Route 1, Box 459, Mitchell, 47446

Michiana CoCo Club, Clay Howe, 310 S. Jefferson St., Sturgis, 49091, (616) 651-4248

IOWA

CoCo Questers, Scott Bellman, 2420 Salem Court, Bettendorf, 52722, (319) 359-7702

Metro Area Color Computer Club (MACCC), David E. Hansen, 3147 Avenue J, Council Bluffs, 51501, (712) 323-7867

Mid Iowa CoCo, Terry G. Simons, 1328 48th Street, Des Moines, 50311, (515) 279-2576

Dubuque Tandy Users Group, Wesley Kullhem, 1995 Lombard, Dubuque, 52001, (319) 556-4137

KANSAS

Hutchinson Color Computer Club, James M. Jones, 612 Idlewild, Hutchinson, 67502, (316) 662-0718

KC CoCo Club, Gay Crawford, P.O. Box 11192, Kansas City, 66111, (913) 764-9413

Micro 80 Users Group, Kevin Cronister, 2224 Hope, Topeka, 66614, (913) 272-1353

Color Computer Club of Wichita, Van Elliott, 532 Brownthrush Lane, Wichita, 67212, (316) 722-7442

KENTUCKY

Perry County CoCo Users Group, Keith W. Smith, General Delivery, Hardburly, 41747, (606) 439-4209

LOCO-COCO, Jim Spillman, 2405 Woodmont Dr., Louisville, 40220, (502) 454-5331

LOUISIANA

Cajun CoCo Club, Rick Herbert, P.O. Box 671, Crowley, 70526, (318) 788-3148

MAINE

Western Maine Color Computer Club, Michael Wewell, Box 780, Bethel, 04217

Tandy Computer Club, Delmer Cargill, P.O. Box 428, Westbrook, 04092, (207) 854-2862

MASSACHUSETTS

Greater Boston Super Color Users Group, Robert Biamonte, 6 Boulder Drive, Burlington, 01803

Massachusetts CoCo Club, Jason Rahaim, Spring St., Lunenberg, 01462, (617) 582-6514

CLUB 6809, Jean Salvas, 204 East Street, Springfield, 01104, (413) 734-5163

MICHIGAN

Color C.H.I.P.S., Jack Pieron, 3175 Oakhill Place, Clarkston, 48016, (313) 627-4358

CCUG (Color Computer Users Group), Rich Van Manen, O-599 Lake Michigan Dr., Grand Rapids, 49504, (616) 453-8351

Tandy Users Group of Grand Rapids, Robert M. Worth, Jr., 1726 Millbank S.E., Grand Rapids, 49508 (616) 245-9324

Greater Kalamazoo Color Computer Club, Jim Rix, 1835 Chevy Chase Blvd., Kalamazoo, 49008, (616) 344-7631

Greater Lansing Color Computer Users Group, P.O. Box 14114, Lansing, 48901

Michiana CoCo Club, Clay Howe, 310 S. Jefferson St., Sturgis, 49091, (616) 651-4248

MISSISSIPPI

Singing River C.C. Club, Mark Welch, 3605 Vancleave Rd., # 118, Gautier, 39553, BBS (601) 875-8688

Gulf Coast Color Computer Assoc., Ed Keels, 22 Christy Cove, Gulfport, 39503, (601) 832-1210

Jackson Color Computer Club, Dorothy N. Welch, 424 Church Street, Madison, 39110, (601) 856-7255

CoCo Art Club, Joel Bunyard, Rt. 16, Box 11, Meridian, 39301, (601) 483-0424

MISSOURI

North County 80 Group, Tom Vogel, 12 Ville Donna Ct., Hazelwood, 63042, (314) 739-4078

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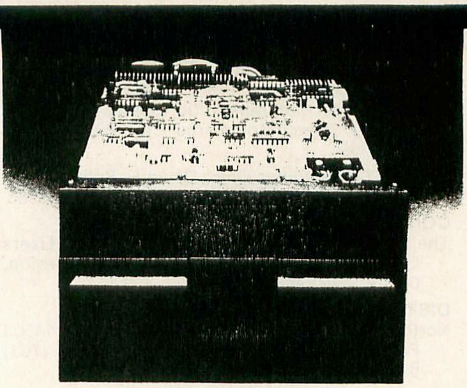

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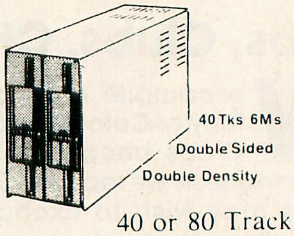

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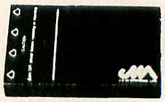

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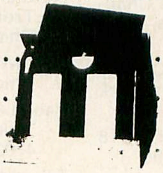

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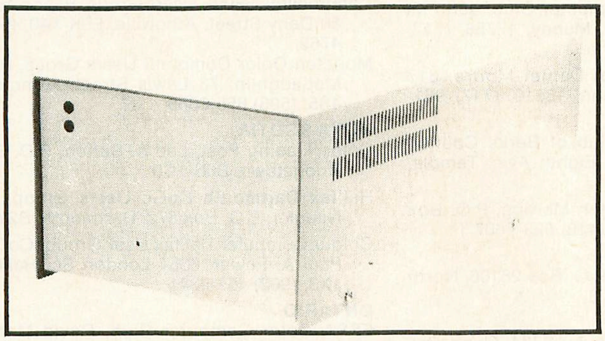

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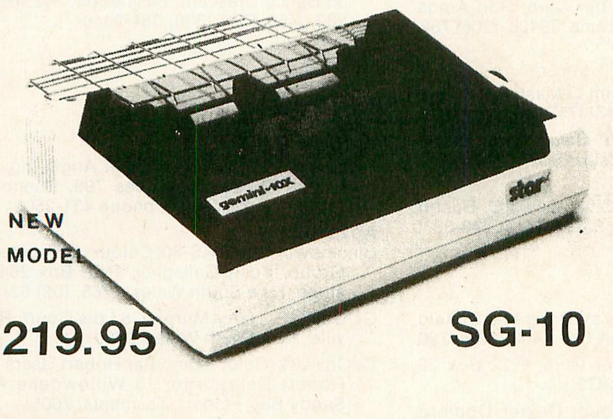

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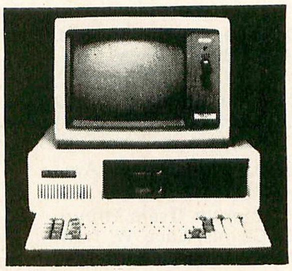

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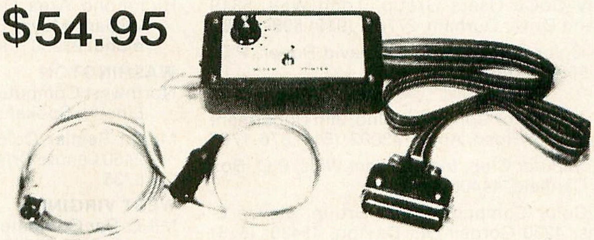

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Coconuts, 1610 N. Marlan, Springfield, 65803

NEBRASKA

Siouxland Color Computer Club, Alan Pedersen, 611 D Street, South Sioux City, 68776, (402) 494-2284

NEVADA

C.A.T. F.U.N., Paul A. Osborne, 201 Miners Road, Fallon, 89406, (702) 423-5789

NEW JERSEY

West Orange CoCo Club, Gregg Favalora, 12 Blackburne Terrace, W. Orange, 07052, (201) 736-1748 (let ring 12 times)

Loco CoCo Club, Bud Lavin, 73B Wavercrest Ave., Winfield Park, 07036

Mercer County Color Computer Users Group, Richard C. Kelly, 1904 Country Lane, W. Trenton, 08628, (609) 883-9270

NEW MEXICO

Chaves County Color Computer Club, Harry Machen, 18 Forest Drive, Roswell, 88201

NEW YORK

Adirondack CoCo Club (Albany Chapter), Ron Fish, Box 4125, Albany, 12204, (518) 465-9793

Adirondack CoCo Club, (Greene County Chapter), Pete Chast, P.O. Box 61, Athens, 12015, (518) 945-1636

Adirondack CoCo Club (Glens Falls Chapter), Richard Mitchell, 39 Center St., Fort Edwards, 12828

Island Color Computer Club, Joseph Castelli, P.O. Box 901, Bellmore, 11710, BBS (516) 783-7506

Kings Byte CoCo Club, Morty Libowitz, 1063 East 84th St., Brooklyn, 11236, (718) 763-4233, BBS (718) 837-2881

C.C. Club of Central N.Y., Joseph Short, 248 S. Fourth Ave., Ilion, 13357, (315) 895-7730

Rockland County Color Computer Users Group, Harold L. Laroff, P.O. Box 131, Monsey, 10952-0131, (914) 425-2274

Olean Area CoCo Users Group, Herman L. Smith, P.O. Box 216, Olean, 14760, (716) 933-7488, BBS (716) 933-7489

The Rochester S-80 Computer Club, Inc., Gary Panepinto, P.O. Box 15476, Rochester, 14615, (716) 392-6133

New York Color Computer User Group, Carl Glovinsky, 15 Bolivar St., Staten Island, 10314, (718) 761-0268

NORTH CAROLINA

Bull City CoCo Users Group, Todd Wall, 5319 Durand Drive, Durham, 27703, (919) 598-1348

Raleigh Color Computer Club, David Roper, P.O. Box 680, Garner, 27529

OHIO

Central Ohio Color Computer Club, Jim Upperman, 5201 Wilcox Road, Amlin, 43002, (614) 876-1767

Color Computer Club, Inc., William Wills, P.O. Box 468, Canfield, 44406

Dayton Color Computer Users Group, Steven E. Lewis, 4230 Cordell Dr., Dayton, 45439, (513) 299-3060

Dayton Area Color Computer Users Group, David R. Barr, 2278 Yorkshire Pl., Kettering, 45419, (513) 293-2228

Greater Toledo Color Computer Club, William Paul Saba Sr., 3423 Cragmoor Ave., Toledo, 43614, (419) 385-9004

Tri-County Computer Users Group, William J. Loeffler, 2612 Dale Avenue, Rocky River, 44116, (216) 356-0779

Miami Valley CoCo Club, Tim Ellis, 1805 W. Parkway Dr., Piqua, 45356, (513) 773-2244

OKLAHOMA

Central Oklahoma Computer Organization, Inc., Martin Schiel, 5313 Spitz Drive, Oklahoma City, 73135, (405) 670-6891

Green Country Computer Association, Michael Keller, P.O. Box 2431, Tulsa, 74101, (918) 245-3456 (DATA)

PENNSYLVANIA

SNUG-Phila., William K. Serody, 1181 Cumberland Road, Abington, 19001, (215) 887-0513

HUG-A-CoCo, George Lurie, 2012 Mill Plain Court, Harrisburg, 17110, (717) 657-2789

Penn-Jersey Color Computer Club, P.O. Box 2742, Lehigh Valley, 18001

Williamsport Area Color Computer Club, John M. Rymell, R.D. 3, Box 182, Muney, 17756, (717) 546-2721

The CoCo Exchange Club, Daniel Moore, 617 Prescott Avenue, Scranton, 18510, (717) 961-0535

Skyline Color Computer Club of Berks County, Lewis F. Brubaker, 4874 Eighth Ave., Temple, 19560, (215) 921-3616

Pittsburgh Color Group, Ralph Marting, P.O. Box 351, West Mifflin, 15122, (412) 823-7607

RHODE ISLAND

New England COCONUTS, P.O. Box 28106, North Station, Providence, 02908

SOUTH CAROLINA

LoCo CoCo Club, Larry Coyle, 4334 Flynn Dr., Charleston, 29405, (803) 747-0802

Midlands 80 Computer Club, Frank Eargle, P.O. Box 7594, Columbia, 29202, TBBS (803) 791-7389

Spartanburg County CoCo Club, Lawrence Easler, Jr., Rt. 1 Highway 221, Spartanburg, 29302, (803) 578-3120

TENNESSEE

Tri-Cities Computer Club, Gary Collins, P.O. Box 4506 CRS, Johnson City, 37602-4506, (615) 929-1862

Foothills Micro-Computer Club, Aaron Sentell, P.O. Box 1541, Maryville, 37801, (615) 982-4629

TEXAS

Alamo Color Computer Club, P.O. Box 690256, San Antonio, 78269

UTAH

Salt City CoCo Club, Dennis Mott, 720 E. Browning Ave., Salt Lake City, 84105, (801) 487-6032, BBS (801) 487-6787

VIRGINIA

Northern Virginia C.C. Club, Bruce Warner, 14503 Fullerton Rd., Dale City, 22193, (703) 690-2453

Central Virginia Color Computer Club, Roger Lee, Rt. 2 Box 175, Madison Heights, 24572

Color Company, Rick Blouin, 12007-C3 Greywing Sq., Reston, 22091, (703) 860-9297

Richmond Area Color Computer Organization, William Mays, 6003 Westbourne Drive, Richmond, 23230, (804) 282-7778

WASHINGTON

Northwest Computer Club, Larry Haines, East 2924 Liberty, Spokane, 99207, (509) 483-5547

Mount Rainier Color Computer Club, Ron Amos, 2450 Lenore Drive N., Tacoma, 98406, (206) 752-8735

WEST VIRGINIA

Mil-O-Bar Computer Club, Jim LeMaster, P.O. Box 130, Ona, 25545, (304) 743-4752 after 4 p.m.

Blennerhassett CoCo Club, David Greathouse, 1306 Wells Circle, Parkersburg, 26101

WISCONSIN

Southern Wisconsin CoCo Club, David C. Buehn, 24607 67th Street, Salem, 53168, (414) 843-3830

CANADA

ALBERTA

Bonnyville User Group (BUG's), Doug MacDonald, Box 2071, Bonnyville, T0A 0L0, (403) 826-4790

The Calgary Color Computer Club, P.O. Box 22, Station M, Calgary, T2P 2G5

Edmonton CoCo Users Group, Dexter Dombro, P.O. Box 4507 Stn. South, Edmonton, T6E 4T7, (403) 439-5245

BRITISH COLUMBIA

Vancouver Colour Computer Club, Box 76734, Stn S, Vancouver, V5R 5S7

Salmon Arm CoCo, David Coldwell, RR #4, Site 26 Comp. 13, Salmon Arm, V1E 4M4

MANITOBA

Winnipeg Micro-80 Users Group, Robert Black, 1755 King Edward St., Winnipeg, R2R 0M3, (204) 633-7196

NEW BRUNSWICK

Campbellton 6809E Users Group, Blaine Arsenault, 80 Deny Street, Atholville, E0K 1A0, (506) 753-4769

Moncton Color Computer Users Group, Robert E. McLaughlin, 73 Lewis Street, Moncton, E1C 4S5, (506) 855-3860

NOVA SCOTIA

Color Trading Post, Lee A. Sutton, P.O. Box 565, Bridgetown, B0S 1C0

Halifax Dartmouth CoCo Users Group, Eugene Naugler, P.O. Box 572, Dartmouth, B2Y 3Y9

Colour Computer Halifax User Group (CoCo Hug), Paul A. Power, 6354 London St., Halifax, B3L 1X3, (902) 455-6341

ONTARIO

ESSA Color Computer Club, David Morrow, 10 Berwick Cres., Angus, L0M 1B0, (705) 424-6985

Kingston CoCo Club, Kenneth Bracey, 316 Westdale Ave., Apt. 4-C, Kingston, K7L 4S7, (613) 544-2806

K-W CoCo Club, P.O. Box 1291, Station C, Kitchener, N2G 4G8

London CoCo Nuts Computer Club, Harry K. Boyce, 180 Concord Road, London, N6G 3H8, (519) 472-7706

Niagara Regional CoCo Club, Gerry Chamberland, 6843 Cumberland Crt., Niagara Falls, L2H 2J9, (416) 357-3462

Ottawa 6809 Users Group, Norm Shoihet, 1497 Meadowbrook Road, Ottawa, K1B 5J9, (613) 741-1763

Sarnia Computer Users Group, J. Verdon, P.O. Box 1082, Sarnia, N7T 7K5, (519) 344-6985

QUEBEC

Club d'Ordinateur Couleur du Quebec, Inc., Centre de Loisirs St-Mathieu, 7110- 8e Ave., St-Michel, Montreal, H2A 3C4, (514) 729-8467

Club Micro Ordinateur de Montreal-Nord, Christian Champagne, 12365 Blv. Langelier #7, Montreal-Nord, H1G 5X6, (514) 323-5958

Les CoCophiles, Robert Chartrand, 17 Bord-de-l'eau, Repentieny, J6A 3K2, (514) 581-1385

Club ORCO-RS, Jacques Bedard, 33 Lisiere, St-Constant, J0L 1X0, (514) 632-4311

Le Club Couleur du Nord, Gabriel Pigeon, C.P. 315, Barraute, J0Y 1A0, (819) 734-2577

SASKATCHEWAN

Saskatoon Color Computer Club, L. Curtis Boyle, 35 Bence Crescent, Saskatoon, S7L 4H9, (306) 382-1459, BBS (306) 384-8040

FOREIGN

ARGENTINA

Freecoco Club, Novoa, Miguel Angel-Ing. Duarte, Omar, Mendez de Andes 799, Buenos Aires, Capital Federal 1405, phone 431-2501

AUSTRALIA

Blacktown City TRS-80 Colour Computer Users Group, Keith Gallagher, P.O. Box 264, Riverstone, New South Wales, 2765, (02) 627-4624

COCOPUG, Harry Murphy, 8 Lois Court, Regentsville, New South Wales, 2750

CoCoHUG (Color Computer Hobart Users Group), Robert Delbourgo, 15 Willowdene Avenue, Sandy Bay, Hobart, Tasmania, 7005

Sunshine Color Computer Club, Stephen Jones, P.O. Box 111, Sunshine, Victoria, 3020

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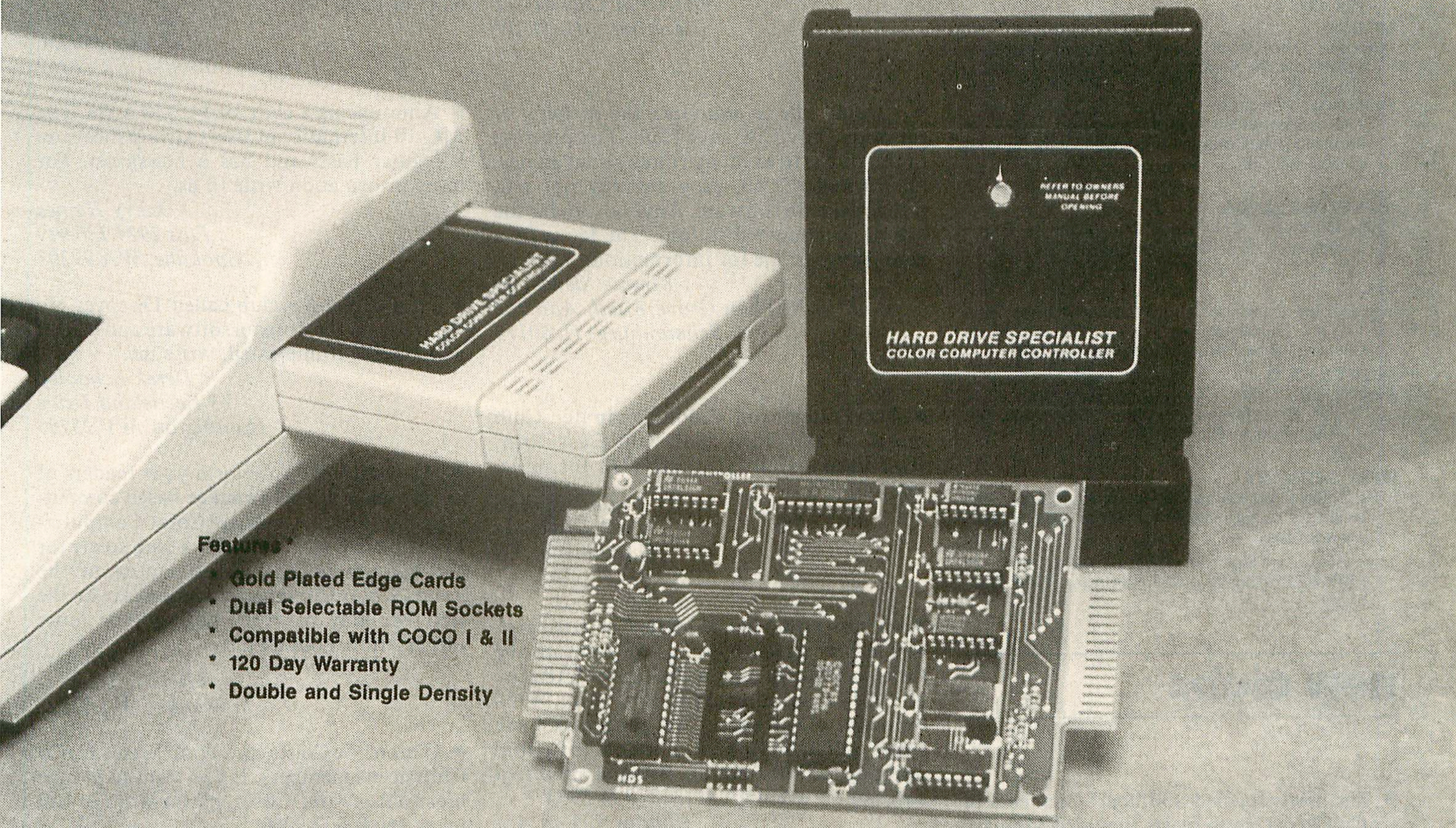
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ISRAEL

The Mid-East CoCo Club, J. Yosef Krinsky, 52/20 Ramot Polin, Jerusalem, Israel, Phone (972) 02-863-354

MEXICO

Mexcoco Users Group, Sergio Waisser, Paseo de la Soledad #120, Mexico City, D.F., 53920, phone 294-36-63

First Color Computer Users Group of Hermosillo, Arturo Fernandez Diaz-Gonzalez, Javier de Leon No. 708, Colonia Pitic, Hermosillo, Sonora, phone 4-75-78

the NETHERLANDS

Color Computer Club Benelux, Jorgen te Giffel, Eikenlaan 1, 4641 GB Ossendrecht, the Netherlands

PERU

Piura Color Computer Club, Carlos Alvarez, Box 142, AV. Guillermo Irazola, J-6 URB. Miraflores Castilla, Piura, Peru, phone (074) 327182

PUERTO RICO

Puerto Rico Color Computer Users Club, P.A. Torres, Cuernavaca 1699, Venus Gardens, Rio Piedras, Puerto Rico 00926, Phone (137) 755-7598

WEST GERMANY

First CoCo Club Hamburg, Theis Klauberg, 2345 Delaware Drive, Ann Arbor, MI 48103 *(temporary address).*

The Greatest German CoCoCooks, Michael Herbes, Dorfstr 23, 4320 Hattinger, West Germany

new clubs

• The newly formed Southeast Connecticut CoCo Users Group meets the third Monday of every month. For information contact me at (203) 448-1388 or the CoConut Manor BBS at (203) 449-1792, 24 hours a day, 7 days a week. Leave a message for SailorBill.

Bill Gross
30 Sycamore Lane
Groton, CT 06340

• The Brandon Color Computer Club meets the second Friday of every month, 7-9 p.m., Room 600, Immanuel Lutheran Church, 2913 S. John Moore Road, Brandon. For more information contact Rich Steinbrueck at the church office.

Brandon CoCo Club
2913 S. John Moore Road
Brandon, FL 33511

• The CoCo Nuts of Central Florida meets on the first Wednesday of every month at 7:30 p.m. If interested, write me or call (305) 855-7867.

George M. Ellenburg
5455 Hansel Avenue (L-7)
Edgewood, FL 32809

• Announcing the Central Illinois CoCo Club. We meet the first Sunday of each month in the conference room at the Bank of Pontiac, in Pontiac from 7-10 p.m.

Tom Golladay
406 North Clay Street
Fairbury, IL 61739

• I would like to announce the forming of the Kids Only CoConut Club. The purpose of the club is to exchange hints about games, POKES and PEEKS, programming tips and public domain software. Anybody under the age of 16 is invited to join. The fee is $1 a year. Write to me for information.

Konnie Siewierski
1010 N. Plum Grove Road, Apt. 202
Schaumburg, IL 60173

• The Hutchinson Color Computer Club meets at the Taco Hut, 600 East 30th, Hutchinson. Call (316) 662-0718 for information.

James Jones
612 Idlewild
Hutchinson, KS

• CCOG would like to invite CoCo users or would-be users to join us. We meet on the third Tuesday of each month from 7-10 p.m. at DSL Computer Products, Inc., 4950 Schaefer, Dearborn. We generally have some presentation and much informal exchange of information. Anyone interested can call me evenings at (313) 334-3934.

Charles S. Van Ark
Bloomfield Hill, MI

• The Hollidaysburg Area Color Computer Club will be having meetings at the Hollidaysburg Public Library every other Tuesday from 5:30 to 7:30 p.m. For information call (814) 695-3522 or write to me.

Shawn Senne
RD 1, Box 77
Hollidaysburg, PA 16648

• I would like to announce the birth of the newest Color Computer club — The CoCo Exchange Club. The club offers a monthly newsletter, reviews, useful programs and hints. Write for more information.

Daniel Moore
617 Prescott Avenue
Scranton, PA 18510

• Announcing the Memphis Color Computer Users Group. For information call (901) 685-0009 or write me.

The Computer Center
c/o Logan Ward
5512 Poplar Avenue
Memphis, TN 38119

• I wish to announce the reorganization of the San Antonio CoCo Club. The new name is the Alamo CoCo Club and meets monthly with membership open to anyone. For additional information, call me at (512) 699-6027 or write.

Harvey Dapeer
P.O. Box 690256
San Antonio, TX 78269

• Announcing a club for MC-10 users. The MC-10 International Users Group meets on a regular basis and has a newsletter. For more information write to us.

Larry Haines
East 2924 Liberty
Spokane, WA 99207

• I am starting a club called Discover 80. We trade public domain software and PEEKS and POKES. If interested, write me.

Derek Schooley
73 Keeneland Drive
Huntington, WV 25705

• We would like to inform your readers of the presence of a Milwaukee based computer group. The CoCo-Mug (Color Computer-Milwaukee Users Group) is a club solely for the enjoyment and enhancement of the Tandy Color Computer. Meetings are on the first Monday of every month. For more information, contact me.

John Davis
4105 N. 79 Street
Milwaukee, WI 53222

• C'mon, CoCoists, the Poor Man's CoCo Club needs members. If you want to get the most out of your CoCo, please write or call me at (608) 562-3260.

Marc Andreessen
Rt. 2, Box 103W
New Lisbon, WI 53950

• I would like to announce the formation of a new club called The Master Key Mutants. A club for all CoCo users. We feature a monthly newsletter that contains reviews of the newest CoCo software, hardware ideas, and a soon-to-be bulletin board. To join, write me or call (403) 276-2726.

Jim Kung
132-43 Avenue N.W.
Calgary, Alberta
Canada T2K 0H6

• The CoCoKnights Color Computer Club is now about to enter its third year. The members are all RAINBOW addicts. For further information please write. The BBS numbers are Rain Board 382-9080, nightly 8-11 p.m. (CoCo system) or Com Line, 727-0352, (Tandy 1000 system).

A. Ooievaar
221 Edward Str.
Victoria, British Columbia
Canada V9A 3E4

• I am pleased to announce the formation of a new CoCo club — Moncton Color Computer User's Group. The club is open to world wide membership. These members will be known as associate members and will receive the club newsletter and membership cards. The membership fee of $8 is to cover the cost of postage and handling. All inquiries are to be mailed to me.

Robert McLaughlin
73 Lewis Street
Moncton, New Brunswick
Canada E1C 4S5

• The Trafasas Computer Club has recently changed its address to: CoCo Co-op, Box 565, Bridgetown, Nova Scotia, B0S 1C0. We trade public domain software and publish a monthly newsletter that reviews programs and also has contests, etc.

Lee Sutton
Box 565
Bridgetown, Nova Scotia
Canada B0S 1C0

• The Essa Color Computer Club meets at Saint Mary's School in Barrie twice monthly on Monday nights. For more information, call Eldon Doucet at (705) 424-1354 or Dave at (705) 424-6985.

Dave Morrow
10 Berwick Cres., Box 844
Angus, Ontario
Canada L0M 1B0

• Announcing a new computer club in Stirling. We will be meeting in the village council chambers on the second Thursday of each month. For more information call (613) 395-2320 or write me.

James R. Dean
RR # 3
Stirling, Ontario
Canada K0K 3E0

• The Burlington Color Computer Users Group holds monthly meetings on the second Tuesday of the month between September and June. Meetings are held in the cafeteria of Burlington Central High School in Burlington. Visitors are welcome. The club serves members from Ancaster, Dundas, Hamilton and Oakville. We publish a newsletter to keep our members up to date on club events as well as programming tips, and the latest information for the CoCo community. We have a good selection of programs available in the club library. Dues are $30 per year which are used to keep our hardware/software library up to date and to publish the newsletter.

Larry Coffey
33 Drakes Drive
Stoney Creek, Ontario
Canada L8E 4G4

• The First Color Computer Club of Israel has changed its name and location. We are now The Mid-East CoCo Club serving the entire Mid-East region with our ever growing library of public domain software. For membership information call (972) 02-863-354 (local time 8-11 p.m., Sunday through Thursday) or write to me.

J. Yosef Krinsky
50/52 Ramot Polin
Jerusalem, Israel

About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

Send your entry (preferably on cassette) to:

THE RAINBOW One-Liner Contest
P.O. Box 385
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CoCo 3
RGB monitor

The Write Stuff

By Bill Cook

Recently I purchased a CoCo 3, and not owning a word processor that can take advantage of the new text screens and colors, I decided to write one. It's rather simple, yet sophisticated enough for most uses. I call the program *Write III.*

The program needs practically no user documentation. It is fully menu-driven and prompts the user through the major steps required. When selecting a line to edit, the text color changes to highlight that line. You may then move the cursor left or right with the arrow keys. To delete a character, position the cursor under the character you want to delete and press SHIFT and the left arrow. To open up space within a line for inserting a character or word, position the cursor where you want the text to break and press SHIFT and the right arrow. Change characters in this mode by simply typing over the old text. To exit the line editing mode press ENTER.

During normal text entering, you can move the cursor right or left with auto-repeat by pressing SHIFT and the appropriate arrow key.

From the menu, simply select the appropriate option for starting a new document, loading in a file, saving a file, viewing the directory, killing files from the disk, or printing a document.

All printing has the following defaults:

Left margin=10
Right margin=10
Printed lines per page=55
Single spacing

These values and a few more can be changed by embedding printer commands into your document. Embedding commands is simple. A semicolon (;) as the first character in a line tells the program that printer commands are to follow. Here's a sample command line:

```
;LM=6 RM=6 SP=2 BF=1
```

This line sets the left margin at six spaces from the left of the page, the right margin at six spaces from the right of the page, single spacing and boldface (emphasized) printing. The command line is an unprinted line, so be sure not to mix text or other information with this line. The main rule to remember is that the semicolon must be the first character of the line.

Another helpful command is `;N` on a line by itself. This command forces a new page.

Readers with programming experience will find it fairly easy to add their own customized printer commands. I have added REM statements to show where printer commands are located. Underlining, for instance, would be a nice additon!

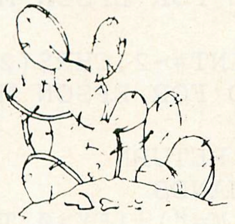
Other than the few rules noted above, there is nothing else to remember. It's almost too easy. Try it, I think you will like it. Remember, a CoCo 3, disk drive and RGB monitor are required. The boldface printer codes are for Epson printers. □

23	9	4173	200
54	23	4190	88
150	170	5400	13
3000	254	5530	113
4040	250	END	134
4143	140		

The listing: 3 WRITER

```
0 'WRITE III - COCO III WORD PRO
CESSOR (C) 1986 BY BILL COOK 11/
19/86
1 PCLEAR1:CLEAR12000:DIML$(200)
5 POKE&HFFD9,0:ON BRK GOTO 9000:
ON ERR GOTO10000
10 CR=80:FG=3:BG=1:WIDTHCR:PALET
TE RGB:PALETTE 1,0:CLS 2:ATTR7,1
:XL=200:FORX=1TO4:X(X)=X+340:NEX
T:XX=247
11 PR$=STRING$(CR,"-"):BL$=STRIN
G$(CR-1,32):DF$=":0":DF=0
12 DATAStart New File,Load Old F
ile,Save Current File,Edit/Revie
w File,Print Current File,Resume
 Document,Kill File,View Directo
ry,Exit to BASIC
13 FORI=1TO9:READM$(I):NEXT:GOTO
100
16 GOSUB33:IFH=CR-4THEN28
17 A$=INKEY$:IFA$=""THEN17
18 A=ASC(A$):RETURN
19 AN$=""
20 GOSUB16:IFA=13THEN25ELSEIFA=3
4THEN20ELSEIFA=21THEN50ELSEIFA=9
3THEN54ELSEIFA=95THEN20ELSEIFA=9
1THEN20
21 IFA=12THENL$(N)=AN$:RETURN
22 IFA<>8THENAN$=AN$+A$:PRINTA$;
:GOTO20
23 IFLEN(AN$)=0THEN19ELSEAN$=LEF
T$(AN$,LEN(AN$)-1):PRINTCHR$(8);
:GOTO20
25 IFA=13THENL$(N)=AN$+CHR$(126)
:N=N+1:IF N=>XL THEN80
26 PRINTCHR$(126):AN$="":GOSUB33
:GOTO20
28 IFMID$(AN$,H,1)<>" "THENH=H-1
:GOTO28
29 L$(N)=LEFT$(AN$,H):LOCATEH,V:
PRINTSTRING$(CR-2-H,32):N=N+1:IF
 N=>XL THEN80
30 AN$=MID$(AN$,H+1):PRINTAN$;:G
OSUB33
31 GOTO20
33 HSTATX$,X,H,V:RETURN
37 LOCATEH,V:RETURN
39 ZZ=INT(CR/2)-INT(LEN(Z$)/2):L
OCATE ZZ,V:ATTR7,1:PRINTZ$:ATTR3
,1:RETURN
46 RP=0:FORX=1TO4:IFPEEK(X(X))=X
X THENRP=1:POKEX(X),255:NEXT:ELS
ENEXT
48 RETURN
50 GOSUB46:IFRP=1ANDLEN(AN$)>0TH
ENAN$=LEFT$(AN$,LEN(AN$)-1):PRIN
TCHR$(8);:H=H+(H-1>-1):LOCATEH,V
:GOTO50 ELSE20
54 GOSUB46:IFRP=1ANDLEN(AN$)<76T
HENAN$=AN$+" ":PRINT" ";:H=H-(H+
1<CR-4):LOCATEH,V:GOTO54 ELSE20
70 IFF$=""THEN100
71 IFINSTR(1,F$,"/")=0 AND INSTR
(1,F$,".")=0 THENF$=F$+".DAT"
72 OPEN"D",1,F$,1:LO=LOF(1):IFLO
=0 THENPRINT:PRINT"File not foun
d.":CLOSE:KILLF$:FORTD=1TO1000:N
EXT:UN=1:RETURN ELSE CLOSE:RETUR
N
100 CLS:H=0:V=0:LOCATEH,V:Z$="Wr
ite III --- CoCo III Word Proces
sor":GOSUB39:V=V+1:Z$="By Bill C
ook":GOSUB39:PRINTPR$;:ATTR3,1
110 FORI=1TO9:LOCATECR/2-12,I+5:
PRINTI;CHR$(8);". ";M$(I):NEXT
115 LOCATECR/2-12,16:PRINT"File
in memory : ";F$
116 LOCATECR/2-12,17:PRINT"No. L
ines      :";N
117 LOCATECR/2-12,18:PRINT"Space
 Remaining:";200-N
120 LOCATE CR/2-16,21:ATTR 7,1,B
:PRINT"Select the option of your
 choice...";:ATTR FG,BG
130 A$=INKEY$:IFA$=""THEN130ELSE
A=VAL(A$)
140 IFA<1ORA>9THENSOUND100,1:GOT
O130ELSECLS:ON A GOTO1000,2000,3
000,4000,5000,6000,7000,8000,900
0
150 SOUND100,1:GOTO140
200 GOTO 200
1000 'START NEW DOCUMENT
1010 F$="":H=0:V=0:POKE282,0:LOC
ATEH,V:Z$=M$(1)+"..Press <CLEAR>
 for MENU":GOSUB39:PRINTPR$;
1020 FORI=0TOXL:L$(I)="":NEXT:N=
0:GOSUB19:POKE282,255:CLS:GOTO10
0
1030 FORI=0TON-1:PRINTL$(I):NEXT
:PRINTL$(N);:GOSUB33:FORI=NTOXL:
L$(I)="":NEXT:GOSUB19:POKE282,25
5:GOTO100
2000 'LOAD DOCUMENT
2005 POKE&HFFD8,0:H=0:V=0
2010 CLS:Z$=M$(2):GOSUB39:PRINTP
```

```
R$;
2020 PRINT"Enter Filename/Ext:";
:LINEINPUTF$:GOSUB70:IFUN=1THENU
N=0:GOTO2010
2030 ATTR7,1:PRINT:PRINT"Loading
 "+F$:ATTR1,1:AN$=""
2040 OPEN"I",1,F$:X=0
2050 IF EOF(1)=-1THEN2100
2060 INPUT#1,L$(X):X=X+1
2070 GOTO2050
2100 CLOSE:N=X:POKE&HFFD9,0:GOTO
100
3000 'SAVE DOCUMENT
3005 POKE&HFFD8,0:H=0:V=0
3010 CLS:Z$=M$(3):GOSUB39:PRINTP
R$;
3020 PRINT"Enter Filename/Ext:";
:LINEINPUTF$:GOSUB70
3040 ATTR7,1:PRINT:PRINT"Saving
"+F$
3050 OPEN"O",1,F$:FORI=0TON:PRIN
T#1,CHR$(34)L$(I)CHR$(34):NEXT
3060 CLOSE:POKE&HFFD9,0:GOTO100
4000 'EDIT DISPLAY
4001 M1$="  <F>orward  <B>ack
<I>nsert line  <D>elete line  <E
>dit line  <M>enu   ":M2$="<F>or
ward      <B>ack        <I>nsert l
ine":M3$="<D>elete line <E>dit l
ine  <M>enu"
4010 CLS:V=0:Z$=M$(4):GOSUB39:PR
INTPR$;
4015 PP=0:SC=1:LP=18:LV=0
4020 LOCATE0,2:POKE282,255:A$=IN
KEY$:FORX=LP*PP TO LP*PP+LP:PRIN
T" "+L$(X):NEXT:V=22:LOCATE0,21:
PRINTPR$;:IFCR=80THENZ$=M1$:GOSU
B39
4021 IFCR=40 THENLOCATE0,22:PRIN
TM2$;M3$;
4025 IFLV>0THENH=0:V=LV:GOSUB37:
GOTO4040
4030 H=0:V=2:GOSUB37
4040 A$=INKEY$:IFA$=""THEN4040 E
LSE A=INSTR(CHR$(94)+CHR$(10)+CH
R$(8)+CHR$(9)+"IDMEFB",A$):ON A
GOTO4120,4120,4120,4120,4140,415
0,4160,4170,4180,4190
4050 SOUND100,1:GOTO4040
4120 IFPEEK(341)=247 ANDV>2 THEN
POKE341,255:V=V-1:GOSUB37:FORTD=
1TO40:NEXT
4130 IFPEEK(342)=247 AND(V<LP+2
AND NO<N-1)THENPOKE342,255:V=V+1
:GOSUB37:FORTD=1TO40:NEXT
4131 IFPEEK(344)=247 ANDH<CR-3TH
ENPOKE344,255:H=H+1:GOSUB37:GOTO
4200
4132 IFPEEK(343)=247 ANDH>0THENP
OKE343,255:H=H-1:GOSUB37:GOTO420
0
4135 NO=LP*PP+V-2:GOTO4040
4140 NO=LP*PP+V-2:IFN+1>200THENL
OCATE0,22:PRINT"Only 200 lines a
llowed....":SOUND100,5:FORTD=1T
O2000:NEXT:GOTO100
4141 IFN=0THENSOUND100,1:GOTO404
0
4142 LOCATE0,22:PRINTTAB(10)"Mak
ing room for insert.....":FORI1=
N TO NO STEP-1:FORI2=0TO3:IF I2=
1THEN4146
4143 I3=PEEK(VARPTR(L$(I1))+I2)
4144 POKE(VARPTR(L$(I1+1))+I2),I
3
4146 NEXT I2,I1:L$(NO)=CHR$(32):
N=N+1:LV=V:GOTO4020
4150 NO=LP*PP+V-2:IFN=0THENSOUND
100,5:GOTO4040
4151 LOCATE0,22:PRINTTAB(10)"Del
eting line.....":FORI1=NO+1 TO N
4152 FORI2=0TO3
4153 IFI2=1 THEN4157
4154 I3=PEEK(VARPTR(L$(I1))+I2)
4155 POKE(VARPTR(L$(I1-1))+I2),I
3
4157 NEXTI2,I1:N=N-1:LV=V:GOTO40
20
4160 GOTO100
4170 NO=LP*PP+V-2:LOCATE0,22:ATT
R7,1:PRINT"Line Edit Mode: Press
 <ENTER> to Exit":LOCATE0,23:PRI
NTBL$;:POKE282,0:IFN=0THENSOUND1
00,5:GOTO4010
4171 A$=L$(NO):Z1$=" !#$%&'()*=1
234567890:-@+;?/>.<,ABCDEFGHIJKL
MNOPQRSTUVWXYZabcdefghijklmnopqr
stuvwxyz":LOCATE1,V:ATTR1,1:PRIN
TA$;:IFH=0THENH=1:GOSUB37 ELSEGO
SUB37
4172 Z$=INKEY$:IFZ$=""THEN4172 E
LSEIFPEEK(343)=247THENPOKE343,25
5:H=H-1 ELSEIFPEEK(344)=247THENP
OKE344,255:H=H+1
4173 IFH<=1THENH=1 ELSEIFH>=LEN(
A$)+1 THENH=LEN(A$)+1
4174 IFZ$=CHR$(13)THENLOCATE1,V:
ATTR3,1:PRINTA$;:L$(NO)=A$:POKE2
82,255:LOCATE0,V:GOSUB33:SOUND10
0,1:LOCATE0,22:IFCR=80THENPRINTM
1$:LOCATE0,V:GOTO4040 ELSEPRINTM
2$;M3$;:LOCATE0,V:GOTO4040
4175 IFZ$=CHR$(21)ANDLEN(A$)>1TH
ENGOSUB33:Z$=INKEY$:PRINTMID$(A$
,H+1);" ";:GOSUB37:A$=LEFT$(A$,H
-1)+MID$(A$,H+1):GOTO4172 ELSEIF
Z$=CHR$(21)ANDLEN(A$)=1THENGOSUB
33:PRINTMID$(A$,H+1);" ";:GOSUB3
```



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```
7:A$=MID$(A$,H+1):GOTO4172
4176 IFZ$=CHR$(93)ANDLEN(A$)<CR-
2THENGOSUB33:Z$=INKEY$:PRINT" ";
MID$(A$,H);:GOSUB37:A$=LEFT$(A$,
H-1)+" "+MID$(A$,H):GOTO4172
4177 IFINSTR(Z1$,Z$)=0THEN4179
4178 IF(H>1 ANDH<CR-2)THENA$=LEF
T$(A$,H-1)+Z$+MID$(A$,H+1):H=H+1
:LOCATE1,V:PRINTA$; ELSE IF(H=1A
NDH<CR-2)THENA$=Z$+MID$(A$,H+1):
H=H+1:LOCATE1,V:PRINTA$;
4179 GOSUB37:GOTO4172
4180 IF(PP+1)*LP<N THENPP=PP+1:G
OTO4020 ELSESOUND100,5:GOTO4040
4190 IFPP*LP>0 THENPP=PP-1:GOTO4
020 ELSE SOUND100,5:GOTO4040
4200 GOTO4040
5000 'PRINT
5001 CLS:PRINT"Is printer on (Y/
N)?";:LINEINPUTY$:IFLEFT$(Y$,1)=
"Y" OR LEFT$(Y$,1)="y"THENPR=1 E
LSEPR=0
5002 PRINT"How many copies";:INP
UTNC:FORQ=1TO NC:CLS:Z$=M$(5):GO
SUB39:PRINTPR$;
5004 LM=10:RM=10:LG=80-LM-RM:LP=
55:PG=0:L1=0:SP=1:BF=0:B$=""
5010 FORI=0TON:IFI=N THENLF=1
5020 A$=B$+L$(I):B$="":IFLEFT$(A
$,1)=";"THEN 5500 'PRINTER COMMA
ND
5030 LL=LEN(A$)
5032 IFLL>LG THEN 5040
5033 X=INSTR(A$,CHR$(126)):IFX>0
THENMID$(A$,X,1)=CHR$(32):B$=""
5034 GOTO5055
5040 B$=MID$(A$,LG+1):A$=LEFT$(A
$,LG)
5041 IFRIGHT$(A$,1)<>" "THENB$=R
IGHT$(A$,1)+B$:A$=LEFT$(A$,LEN(A
$)-1):GOTO5041
5055 GOSUB5400
5056 X=INSTR(B$,CHR$(126)):IFX>0
THENA$=B$:B$="":GOTO5030
5060 NEXTI,Q
5399 GOTO100
5400 GOSUB33:LOCATELM,V:POKE&HFF
D8,0:PRINTA$
5410 L1=L1+SP:IFSP=2THENPRINT EL
SE IFSP=3THENPRINT:PRINT
5411 IFPR=0THEN5490 ELSEPRINT#-2
,TAB(LM);A$
5415 IFSP=2THENPRINT#-2:ELSEIFSP
=3THENPRINT#-2:PRINT#-2
5420 IF(L1=>LP OR LF=1)THEN PRIN
T#-2:L1=L1+1:IFL1=60 THENPRINT#-
2,TAB(35);"-";PG+1;"-":PRINT#-2,
CHR$(12):L1=1:PG=PG+1:LF=0:ELSE5
420
5430 IFBF<>0THENPRINT#-2,CHR$(27
);"E"; 'EMPHASIZED FOR EPSON MX-
 ON
5431 IFBF=0THENPRINT#-2,CHR$(27)
;"F"; 'EMPHASIZED FOR EPSON MX-
 OFF
5490 POKE&HFFD9,0:RETURN
5500 'PRINTER COMMANDS
5510 X=INSTR(A$,"LM="):IFX>0 THE
NLM=VAL(MID$(A$,X+3,2)):IFLM>20T
HENLM=20
5520 X=INSTR(A$,"RM="):IFX>0 THE
NRM=VAL(MID$(A$,X+3,2)):IFRM>20T
HENRM=20
5530 X=INSTR(A$,"LP="):IFX>0THEN
LP=VAL(MID$(A$,X+3,2)):IFLP>66 T
HENLP=66
5540 X=INSTR(A$,"PG="):IFX>0THEN
PG=VAL(MID$(A$,X+3,2))
5550 X=INSTR(A$,"SP="):IFX>0THEN
SP=VAL(MID$(A$,X+3,2)):IFSP>3THE
NSP=3
5560 X=INSTR(A$,"BF="):IFX>0THEN
BF=VAL(MID$(A$,X+3,2))
5570 X=INSTR(A$,";N"):IFX>0THENL
F=1 ELSE LF=0
5575 LG=80-LM-RM
5580 GOTO5060
6000 'RESUME
6010 CLS:H=0:V=0:Z$=M$(6):GOSUB3
9:PRINTPR$;
6020 FORI=0TON-1:PRINTL$(I):NEXT
:PRINTL$(N);:POKE282,0:GOSUB33:G
OSUB20:POKE282,255:GOTO100
7000 'KILL
7005 POKE&HFFD8,0
7010 CLS:Z$=M$(7):GOSUB39:PRINTP
R$;:DIR:PRINT
7020 PRINT"Enter Filename/Ext:";
:LINEINPUTF$:GOSUB70:IFUN=1THENU
N=0:GOTO7010
7030 ATTR1,1:PRINT:PRINT"Are you
 sure? (Y/N)?";:INPUTS$:IFLEFT$(
S$,1)<>"Y"THEN7010
7040 ATTR7,1:PRINT"Killing "+F$:
KILL F$:POKE&HFFD9,0:GOTO100
8000 'DIR
8010 CLS:POKE&HFFD8,0:Z$=M$(8):G
OSUB39:PRINTPR$;:DIR:PRINT
8020 ATTR7,1:PRINT"Press any key
 to return to MENU":EXEC44539:PO
KE&HFFD9,0:GOTO100
9000 POKE&HFFD8,0:POKE282,255:ST
OP
10000 PRINT"ERROR #";ERNO;"IN LI
NE";ERLIN:GOTO9000
```

Command Causes CoCo 3 System Crashes

By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

If I execute the following commands, either in direct mode or as part of a program, my CoCo 3 crashes. This seems to be a design problem with the machine, since I have experienced the same problem with a number of machines.

```
CLEAR 17000: WIDTH 40
```

A similar problem arises if I run a program that constantly increases the size of the stack:

```
10 WIDTH 40
20 GOSUB 30
30 PRINT MEM:GOTO 20
```

On the CoCo 3, the system crashes, whereas on my CoCo 2, I get an OM Error. The net result is that programs that use a lot of string space and/or space for machine language segments will not run with the `WIDTH 40` *statement added. I would appreciate it if you could suggest possible solutions.*

Terry A. Jackson
Associate Professor
Midwest College of Engineering

℞ The designers of the CoCo 3, in an attempt to maintain as much compatibility as possible with the CoCo 1s and 2s while abiding with the licensing agreements from Microsoft, could neither modify nor rewrite the ROM code of Color BASIC, Extended BASIC, or Disk BASIC. It had to be a patch job and the 8K had to come from an area in the range $0000-$7FFF. Due to these design limitations, they chose Super Extended BASIC to use the address space $2000-$3FFF (16384-24575) as a swap area to permit the CoCo's 6809E to address the Hi-Res text screen from its normal 64K address space.

This design can cause problems if your program expects to find something in the swap space at the time it is swapped out. The solution is to keep the stack out of this area. Instead of clearing a lot of memory above $3FFF for machine language programs, use the `PCLEAR` command to clear space below and place your CoCo 3 machine language programs in memory starting at $600 (for cassette) or $E00 (for disk). If you have huge character string requirements, save the strings in a random access file. If file I/O is too slow, J&R's JramR 512K upgrade includes RAM disk software. The software is also available separately and is compatible with other 512K CoCo 3 upgrades. Keep in mind that the CoCo 3 is primarily an OS-9 machine and when running with it, none of these problems arise.

MC-10 Software Available

In your December '86 column, Nicholas Petroff asked if there was a way to make his MC-10 more like the CoCo. As a matter of fact, all the things he asked for (and more) are available for the MC-10 through the MC-10 users group. My MC-10 has Extended BASIC (`EXT.BAS` *by Gary Furr), RAM disk (*MCDOS *by Grahame Pollock), Assembler (Ass-6803),* MCOS *(by MJB), Conversion programs (*CoToPo *and* PoToCo *by Bob Schecter), Word Processor (*McWord *by Bob Schecter) and various disassemblers, utilities and programs. These programs are available both as listings in the MCUG newsletter and on tape. There is also a 64K upgrade available from Helen Francisco that gives 44K RAM for BASIC and ML programs and ROM 1.4 (on tape) which uses this extra memory. Anyone wanting more information should send $1 and a #10 SASE to: MC-10 Users Group, Box 103, Owensville, IN 47665 for a sample copy of our 20-page newsletter.*

Larry Allen

℞ Face it, Larry. The MC-10, though it has lots of company (PC Jr., TI-994A, VIC-20, Sinclair-1000, etc.), is an orphan machine. I would still advise an MC-10 owner to cut his losses and go with a CoCo 3. The TV and cassette recorder with cable for the MC-10 will work with the CoCo 3, but that's about it.

Richard Esposito is a senior project engineer with Northrop Corp. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

CoCo 3 Keyboard

Where can I get a CoCo 3 keyboard for my CoCo 2?

John Wittman
Greens Fork, IN

℞ Order part number AXX-0245 from Radio Shack National Parts via your local Radio Shack dealer. The cost is $19.90.

Upgrading the New CoCo

How do you upgrade a CoCo 3 to 512K? Is soldering necessary?

Virginia Niewoehner
Chicago, IL

℞ Soldering is not necessary. You unplug the four 41464 64K by 4 RAM chips, cut out the disk capacitor C65 and then plug in the satellite memory board. Various satellite memory boards are marketed by J&R Electronics, Radio Shack National Parts (Part No. AXX-7117) and others.

Scrambled Downloads

I own a CoCo 2 with one drive and a DCM-3. My friend owns a TRS-80 Model I (old silver Z-80 model, not a CoCo) with two drives and a DCM-1 modem. When we try downloads, they always become scrambled on my end.

Jimmy Munroe
Sussex, New Brunswick

℞ First, one modem must be set to "Answer," the other to "Originate." Second, both computers must be running smart terminal programs with identical protocol settings (i.e., word length, parity, stop bits, etc.). Third, since the machines are not software-compatible, only ASCII-formatted files or ASCII-saved BASIC programs can be transferred.

Memory Poke for Disk

I have a converted 64K CoCo with two disk drives. When typing in the memory poke, `POKE 25,6:NEW`*, I find that I cannot load anything from a disk. The disk starts to load but then quits in the middle of the load and continues to run with no further loading. I have to shut down the machine to do anything else. Why? Is there a fix?*

Raymond R. L. Hoem
(MONTKID)
Billings, MT

℞ Apparently, what you are trying to do is simulate a `PCLEAR0`. Disk BASIC uses the area between &H600 and &HDFF, but by executing your poke, you let BASIC overwrite this area, raising havoc with Disk BASIC. If you want to use as much memory as possible with Disk BASIC, use `POKE 25,14:POKE &HE00,0:NEW`.

Non-compatible Apple Drives

I just acquired two TEAC drives. They were used in the past on an Apple (Acorn) computer. I tried to use them with my CoCo but all I got were I/O Errors. I have one TEAC drive, the same kind, a slim-line, sort of like the new Radio Shack drives turned on their sides. I was wondering if I could configure these drives for a 64K CoCo. Will I need any different configuration with the new CoCo 3?

Erol Senakis
(EROL)
Elmhurst, NY

℞ Apple-compatible disk drives use a non-standard interface. CoCo drives use the IBM standard. Drives that work with the CoCo 1 or 2 will also work with the CoCo 3.

9600 Baud on CoCo 3

I used to be able to poke a `1` *into Location 150 for my printer speed on my old gray CoCo 1. I have a CoCo 3 now and it doesn't seem to recognize anything faster than an 18 or 2400 baud in* `POKE 150`*. I have a Model 101 Metric Ind. serial-to-parallel converter and it ran my Okidata 192 fine at 9600 baud. Any suggestions?*

Ronald C. Bruellisauer
(RONBWY)
Cheyenne, WY

℞ Try poking a 4 into Location 150 for 4800 baud. For 9600 baud you will have to adjust your Model 101.

ATTR Is a Pain

Is there any way to permanently disable the permissions feature for files in Level I OS-9? Having to remember to set `ATTR` *every time I want to do something even though I have a single-user system is a pain.*

Clell Harmon
(NAVYMAN)
Wichita, KA

℞ I use OS-9 all the time and hardly ever need to mess with the `ATTR` command. The permissions feature is meant as a safeguard so that you can protect files from accidental erasure or modification. The only program I have found that requires me to go back and reset the permissions is *StyFix*, the configuration program for the word processor *Stylograph*, and it is only used once when setting up a new printer.

Boot Query

I enjoy learning BASIC by examining and modifying other programs. I have a very fine boot program for disk system, but for the life of me cannot figure it out. This is the listing:

```
10 CLS
20 A=PEEK(&H1B)*256+PEEK
(&H1C)6
30 PRINT"<<AUTO BOOT>>":PRINT
40 PRINT"up GO UP"
50 PRINT"down GO DOWN"
60 PRINT"enter EXECUTE"
70 PRINT"break ABORT"
80 EXEC A
90 END
```

It seems as though the only two lines that do anything are 10 and 80, yet if I type only these two lines and run, it will not work. If I load and run off my disk however, it works. Why is this?

David Johnson
(DAVIDJOHNSON)
Leicester, NC

℞ Apparently, the BASIC program you load from disk has an embedded machine language program attached to it. After loading the program, examine the address calculated from `PEEK(27)*256+PEEK(28)`. You will find it is well past the end of your BASIC program allowing room for the ML.

New Keyboard for an 'E' Board

I need to fit an 'E' board with a newer keyboard. Would it be easier to buy an adapter for the newer keyboards, or build one myself?

Keith Wayne Smith
(UGLY)
Hardburly, KY

℞ You can purchase a keyboard adapter for a nominal fee. Also, if you purchase a new keyboard upgrade from Tandy, it is included if you tell them that it is for an old CoCo 1.

MORETON BAY SOFTWARE

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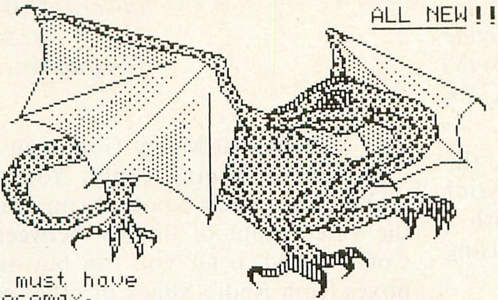

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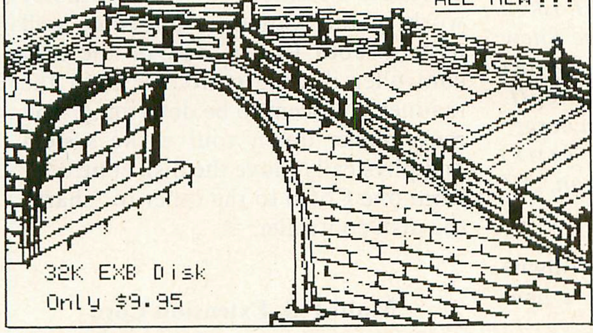

32K EXB Disk
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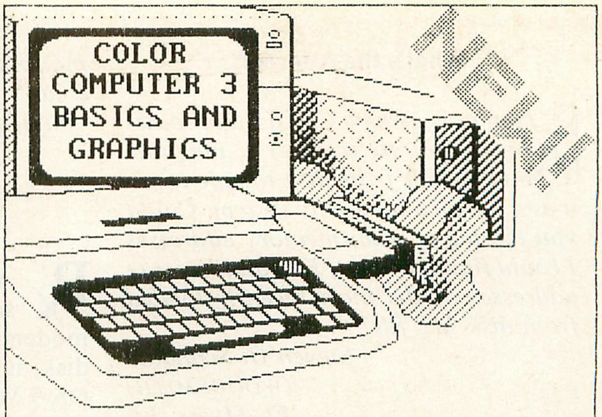
COLOR COMPUTER 3 BASICS AND GRAPHICS
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Not only that, the Guide includes a disk of programs and pictures. Translate low res graphics onto the high resolution screen. Draw on the 320 by 192, 16 color or the 640 by 192, 4 color screens. Learn how to display 256 artifacted colors on a television or composite monitor.

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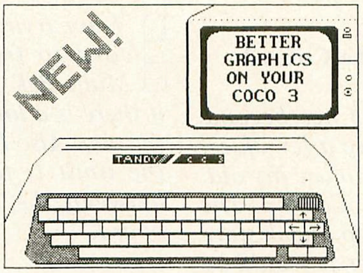
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Printer, Plug´n´Print, paper, black and color ribbons, instruction and software. $240 plus $10 shipping.

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Dump PMODE 3 and PMODE 4 graphics from your Color Computer to the Okimate 20 printer. Select 2 color, 4 color or black and white screen dumps. $29.95

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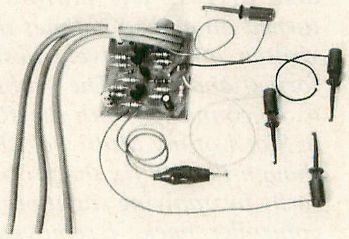

Finally a monitor driver for the Color Computer II that lets you use a monochrome and a color monitor simultaneously. We're proud of this new driver. The six transister circuit provides optimal signal mixing and signal gain. Excellent monochrome output and better quality resolution in the color ouput than any driver we have seen. Audio output also. Fits all models of the Color Computer II. $29.95.

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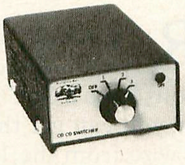

The CoCo Switcher allows you to hook up three peripherals to your RS-232 jack. Connect your modem, printer and any other RS-232 compatible peripheral to the CoCo Switcher. An LED on the CoCo Switcher shows if your computer is on or off at a glance. The LED flickers when transmitting or receiving data.

$39.95 plus $2.00 shipping and handling

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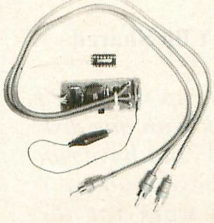
The BEST monitor driver available. Color composite, monochrome and audio output. For original CoCo D, E and F boards. $24.95.



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Send $2.00 shipping and handling per order. We ship within 1 working day on receipt of order. Blue Label Service available. California residents add 6% sales tax.

What's the Address?

I am now using a CoCo 3 and sometimes want to transfer a machine language file from disk to tape to try it as a file on a tape-only system. Could you tell me at what memory addresses I could find the Start, End and Execute addresses of the most recently loaded from disk ML file?

Steven G. Schnautz
(WOODSMITH)
Ft. Myers, FL

℞ The addresses from disk machine language files cannot be peeked out of memory like they can with one that is loaded from tape. A program is needed to get this information. One such program that will give you this information is Jeff Francis' *Disk Utility* 2.1A, $29.95 from Spectrum Projects.

Corrosion Confusion

I have a 64K CoCo 1, a 26-3024 Multi-Pak, the older disk controller and an RS-232 pack. I have been having intermittent problems with my disk drives. The motors randomly turned on and sometimes the disk was written on, effectively destroying the format and data. The problem seemed to be connected with the RS-232 pack in Slot 1 of my Multi-Pak. It seemed as though I could fix the problem temporarily by applying slight pressure to the controller pack. I removed the pack, took it apart and noted some corrosion on the ground tabs on the connector. I cleaned the connector and put the system back together and have not had the problem return. My question — was this a coincidence? If this could not have been the problem, what could the problem be?

Harold M. Wilson
(HAL2356)
Austin, TX

℞ The problem was in the connectors on your controller. Frequently, with controllers that do not have gold-plated connectors, oxidation causes corrosion to build up on the surfaces that mate with your CoCo. Using a pencil eraser to clean the connectors on your controller removes the oxidation from the surfaces and makes it as good as new.

Can't Save to Disk

I am using a direct connect modem pack with a multipack. I have been told there is a poke that would allow me to save to disk. For the life of me I can't find a soul who knows it. Can you help?

Vince Falcone
(IYAVIN)
Minden, NV

℞ As with the RS-232 pack, the software in the ROM of your modem pack is tape-oriented. With a disk, it is useless unless you are using OS-9 Version 2.0 or later.

OS-9 Level 1 Patches

I have a CoCo 3 and cannot boot my OS-9 Level I, Version 1.00. Is there an easy way to get it to run? I asked a local Radio Shack dealer if he knew of any upcoming patches, but he just recommended that I purchase Level II.

John C. Henneberger
(AMX)
Tucson, AZ

℞ The patches are now in the download section of RAINBOW's new OS-9 Online SIG on Delphi.

Compatibility With the CoCo 3

*Now that the CoCo 3 has become widely available, I have a few questions. First, am I able to use my old, silver TEC drive on a new CoCo 3? The salesman at my local Radio Shack store has no clue as to whether it would be possible or not. Secondly, will my old software (*VIP Desktop, CoCo Max II, *etc.) work on the CoCo 3?*

Fredrik J. Ahlberg
(FREDALBERG)
Kingston, NH

℞ Your old controller requires 12 volts. You can get the required 12 volts from a CoCo 3 adapted multipack, or you can get the 12 volts by running a wire from the 12-volt source on your disk drive's power supply (this requires some hardware experience). Patches for *CoCo Max* are now on Delphi. Hints as to how to fix various versions of VIP software are there too.

Disk Controller Can't Be Shared

I would like to hook up my CoCo 2 and CoCo 3 to work with one disk controller and one TV, but have run into a few problems. I have found a Y cable that I think will work for the controller, but haven't found a way to connect the TV yet. Can you help?

Edward A. Wolf
(LSPC)
Queens, NY

℞ Thanks to Marty Goodman for the following reply: You can make up a switch box that can switch the video input of the TV between a CoCo 2 and 3. Or you can buy such boxes from Radio Shack or other consumer electronic suppliers. They are inexpensive and widely available. It is impossible to electrically switch a disk controller between CoCos in any simple or effective fashion. A Y cable will *not* work in this situation, and may well destroy both CoCos and/or the disk controller if you try to use it in the manner you seem to be describing. You must power down your entire system and physically move the disk controller from one CoCo to the other to "share" the disk controller.

Multi-Pak Extension Cord

I am trying to make an extension cord to free my CoCo from my Multi-Pak. What I need to know is if there is a limit to the length between the two. Also I would like to know what the limit is for extending the cable between the keyboard and motherboard.

Eric A. Canha
(MARKTWAIN)
Fairhaven, MA

℞ Any type of extension cable for your multipack will lead to unreliable disk operation due to timing problems. Don't do it!

As for the keyboard cable, some hackers report using cables 6 to 10 feet in length with no problems.

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.

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CoCo Calligrapher - (Hybrid BASIC/ML) Turn your CoCo and dot-matrix printer into a calligrapher's quill. Make beautiful invitations, flyers, certificates, greeting cards, labels and more. Includes 3 fonts: *Gay Nineties, Old English* and *Cartoon.* The letters are ½ inch high and variably spaced. Works with many printers including Epson, Gemini, Radio Shack, Okidata 92A, Banana and Prowriter. Additional fonts are available (see below). Tape/Disk; **$24.95.**

OS9 Calligrapher - (C) Although a different program from the CoCo Calligrapher, the OS9 Calligrapher prints all the same fonts. It reads a standard text file which contains text and formatting directives. You may specify the font to use, change fonts at any time, centering left, right or full justification, line fill, margin, line width, page size, page break and indentation. Similar to *troff* on UNIX (tm) systems. Includes Gay Nineties, Old English and Cartoon fonts. Additional fonts are available (see below). Disk only; OS9; **$24.95.**

Calligrapher Fonts - Requires Calligrapher above. Each set on tape or disk; specify RSDOS or OS9 version; **$14.95** each. **Set #1** - (9 fonts) Reduced, reversed and reduced-reversed versions of Gay Nineties, Old English and Cartoon; **Set #2** - (8 fonts) Old Style and Broadway; **Set #3** - (8 fonts) Antique and Business; **Set #4** - (8 fonts) Wild West and Checkers; **Set #5** - (10 fonts) Stars, Hebrew and Victorian; **Set #6** - (8 fonts) Block and Computer;

Economy Font Packages on disk; specify RSDOS or OS9; **29.95: Font Package #1** - Above font sets 1, 2 and 3 (25 fonts) on one disk. **Font Package #2** - Above font sets 4, 5 and 6 (26 fonts) on one disk.

UTILITIES

Auto Run 64 - (Hybrid BASIC/ML) Utility to allow your own *tape-based* BASIC or ML programs to display a graphics title screen and then self-start after loading. Includes a graphics editor to create professional looking title screens. Tape only; 16K ECB; **$19.95.**

Piratector - (100% ML) Utility to allow your own *disk-based* BASIC or ML programs to display a graphics title screen and then self-start after loading. Adds copy protection to your programs but still allows users to create *non-executable* backups! Includes Semigraf. Disk only; CoCo I, II, III (except Semigraf); **$39.95.**

A complete catalog of other sweet Sugar Software products is available.

Semigraf Graphics Editor - (100% ML) Use 8 colors and standard text characters to draw graphics pictures and screens in high resolution *semigraphics* mode. Includes sample pictures. Tape/Disk; 16K CB; **$19.95.**

Super Screen Machine - (100% ML) Put your CoCo into high resolution mode for your own BASIC or ML programs. Smooth scroll, key click, lower case with colored characters, many other features. Tape/Disk; 32K CB; CoCo I, II, III (except 64K mode); **$19.95.**

Color Disk Manager - (100% ML) Disk utility with these features: Disk repair, selective track initialization, verify sectors, backups, tape to disk transfer, ROM Pak execution from disk, much more! Tape/Disk; CoCo I, II, III (except for 64K mode); **$24.95.**

Color Tape Manager - (100% ML) Tape utility with these features: display start, end and exec address of ML programs, convert ML programs into BASIC *DATA* statements, append ML to BASIC, load, display/modify and save tape file, handles missing EOF and filename blocks, much more! Tape/Disk; 16K ECB; CoCo I, II, III (except for 64K mode); **$19.95.**

INFORMATION MGT.

TIMS (The Information Management System) - (Hybrid BASIC/ML) Tape or disk, fast and simple general data base program. Create *files* of *records* that can be quickly sorted, searched, deleted and updated. Powerful printer formatting. Up to 8 *user* fields, sort on up to 3 fields. Tape/Disk; **$19.95** (see combo pkg below).

TIMS Mail - (Hybrid BASIC/ML) Tape or Disk based mailing list management program. Files are compatible with TIMS. Fast and simple to use. Supports labels 1, 2 or 3 across, 2½ to 4 inches wide. Tape/Disk; **$19.95** (see combo pkg below).

TIMS Utility - (Hybrid BASIC/ML) Utility companion for TIMS and TIMS Mail to allow multi-term search (*AND* and *OR* logic), global change and delete, split large files and more! Tape/Disk; **$14.95** (see combo pkg below).

TIMS Combo Package - All three of the above programs: TIMS, TIMS Mail and TIMS Utility on one disk - **$34.95.**

SPORTS STATISTICS

Statistics programs for the coach, team manager or avid fan who wants to keep accurate team and opponent records. Printer output supported. The following are available: Baseball, Basketball, Football and Soccer. Disk only; **$19.95** each.

EDUCATIONAL

Silly Syntax - (Hybrid BASIC/ML) Ages 5 and up. Story creation game; output to screen or printer; includes 2 stories or create your own. Tape/Disk; **$19.95** or disk with 62 stories for **$29.95.** Sets of 10 stories on tape/disk for **$4.95:** Fairy Tales, Current Events, X-Rated, Sing-Along, Adventure, Potpourri.

Bible Stories Adventure - (Hybrid BASIC/ML) Ages 4 and up. A simple graphics adventure game for young children and their families. Old testament. Tape/Disk; **$19.95.**

The Presidents of the USA - (100% ML) Ages 10 and up. Two trivia games, user modifiable, printer output supported. Tape/Disk; 16K ECB; **$19.95.**

The Great USA - Ages 9 and up. Sharpen your knowledge of the 50 states. Capitals, nicknames, abbreviations, flowers, trees, birds. Trivia! Tape/Disk; 16K ECB; **$19.95.**

Galactic Hangman - Ages 7 and up. Exciting new twist to the popular word game. Outstanding graphics; 700 word vocabulary. Tape/Disk; 16K ECB; **$19.95.**

PreReader - (Hybrid BASIC/ML) Ages 3-5 (level 1); Ages 5-7 (level 2); Great graphics and music. Level 1: matching colors, shapes, letters and numbers; Level 2: association of letters and consonant blends with their sounds. Tape/Disk; Joystick; **$19.95.**

Statgraf - High school and college level; Linear regression analysis program combined with a plotting and line graphing system. Enter up to 250 x/y pairs; data transformation; residuals; regression line; print graph with screen print program (not supplied); much more! Tape/Disk; **$19.95.**

SPECIAL INTEREST

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Radio Systems Design Calculations - Performs 14 different calculations commonly used in design or evaluation of land mobile radio systems, satellite TV, etc. Tape/Disk; **$19.95.**

CoCo Knitter - Easy to use program to display or print instructions to knit a sweater: Cardigan or Pullover; Round or V-neck; Raglan or Set-in Sleeve; 3 weights or yarn; 8 sizes from baby to man. Tape/Disk; **$19.95.**

Flying Tigers - (100% ML) Fast *Defenders* style arcade game. 5 levels of difficulty; Great graphics and sound effects. Tape/Disk; Joystick; **$19.95.**

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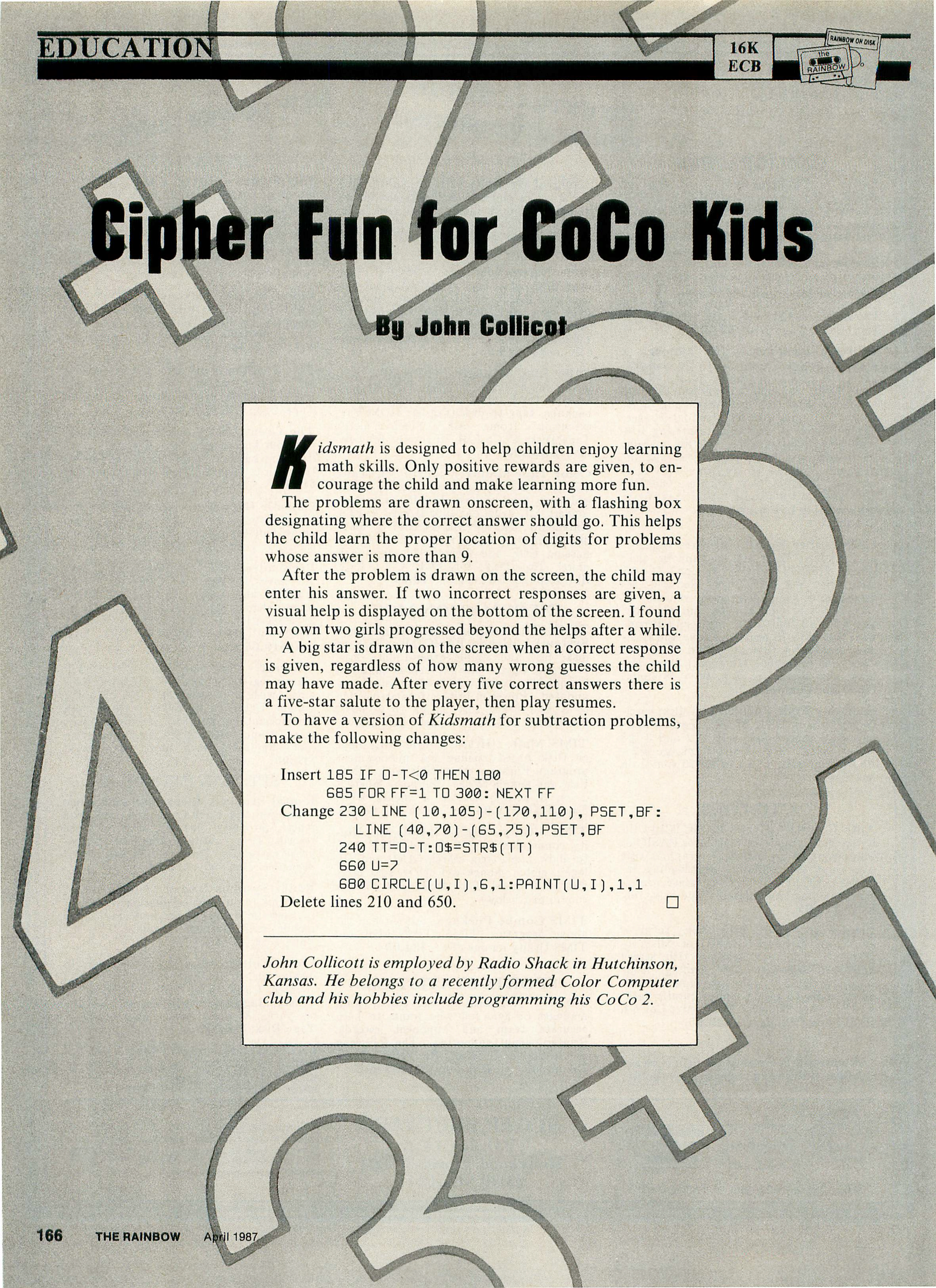
All programs run on the CoCo I, II and III, 32K Extended Basic, unless otherwise noted. Add $1.50 per tape or disk for postage and handling. Florida residents add 5% sales tax. COD orders add $4. Dealer inquiries invited.



Cipher Fun for CoCo Kids

By John Collicot

Kidsmath is designed to help children enjoy learning math skills. Only positive rewards are given, to encourage the child and make learning more fun.

The problems are drawn onscreen, with a flashing box designating where the correct answer should go. This helps the child learn the proper location of digits for problems whose answer is more than 9.

After the problem is drawn on the screen, the child may enter his answer. If two incorrect responses are given, a visual help is displayed on the bottom of the screen. I found my own two girls progressed beyond the helps after a while.

A big star is drawn on the screen when a correct response is given, regardless of how many wrong guesses the child may have made. After every five correct answers there is a five-star salute to the player, then play resumes.

To have a version of *Kidsmath* for subtraction problems, make the following changes:

```
Insert 185 IF O-T<0 THEN 180
       685 FOR FF=1 TO 300: NEXT FF
Change 230 LINE (10,105)-(170,110), PSET,BF:
           LINE (40,70)-(65,75),PSET,BF
       240 TT=O-T:O$=STR$(TT)
       660 U=7
       680 CIRCLE(U,I),6,1:PAINT(U,I),1,1
Delete lines 210 and 650.
```

☐

John Collicott is employed by Radio Shack in Hutchinson, Kansas. He belongs to a recently formed Color Computer club and his hobbies include programming his CoCo 2.

41 181	420 230
62 64	730 237
93 106	1210 93
150 177	END 165

The listing: ADDITION

```
1 GOTO 1100
5 'KIDSMATH BY JOHN COLLICOTT
10 CIRCLE(X,Y-1),24,3,1:LINE(X-2
2,Y-3)-(X-22,Y+3),PSET:LINE(X+22
,Y-2)-(X+22,Y+2),PSET:LINE(X-2,Y
-23)-(X+2,Y-23),PSET:LINE(X-2,Y+
21)-(X+2,Y+21),PSET
11 CIRCLE(X,Y-1),16,3
12 PRESET(X,Y+22):PRESET(X,Y+23)
:LINE(X-3,Y-24)-(X+3,Y-24),PRESE
T:PRESET(X,Y-25):PRESET(X-24,Y-1
):PRESET(X+24,Y-1):PRESET(X-24,Y
-2):PRESET(X+24,Y-2)
13 PAINT(X-17,Y-1),3,3
15 RETURN
20 DRAW"BM"+STR$(X-15)+","+STR$(
Y+20)+";BR7R20U5L5U38L10G8F5E5D3
0L8D5"
21 PAINT(X,Y-15),3,3
25 RETURN
30 DRAW"BM"+STR$(X-20)+","+STR$(
Y+15)+";D5R40U5L30"
31 LINE(X-20,Y+15)-(X+11,Y-10),P
SET:LINE(X-10,Y+15)-(X+21,Y-8),P
SET:LINE(X-18,Y-15)-(X-11,Y-12),
PSET
32 CIRCLE(X,Y-5),20,3,1,.6,.98:P
RESET(X,Y-25):PRESET(X,Y-24):LIN
E(X+20,Y-9)-(X+20,Y-3),PRESET
33 CIRCLE(X,Y-5),15,3,1,.6,.96
34 PAINT(X-10,Y+17),3,3
35 RETURN
40 CIRCLE(X,Y-5),15,3,1,.6,.98
41 CIRCLE(X,Y+3),15,3,1,.03,.4
42 LINE(X+13,Y+2)-(X+6,Y-1),PSET
:LINE -(X+13,Y-6),PSET
43 CIRCLE(X,Y-5),20,3,1,.6,.99:C
IRCLE(X,Y+3),20,3,1,.02,.4:PRESE
T(X,Y-25):PRESET(X,Y-24):PRESET(
X,Y+23):PRESET(X,Y+22)
44 LINE(X+19,Y-5)-(X+15,Y-1),PSE
T:LINE-(X+19,Y+4),PSET
45 LINE(X-18,Y-15)-(X-11,Y-12),P
SET:LINE(X-16,Y+15)-(X-10,Y+10),
PSET
46 PAINT(X,Y-22),3,3
47 RETURN
50 DRAW"BM"+STR$(X+15)+","+STR$(
Y+20)+";U15R4U5L4U23L6D23L20U23L
5D28R25D15R6"
51 PAINT(X+13,Y+15),3,3
52 RETURN
60 CIRCLE(X-2,Y+2),20,3,1,.65,.4
:PRESET(X-2,Y+22):PRESET(X-2,Y+2
1):PRESET(X-2,Y-18):PRESET(X-2,Y
-17):PRESET(X+18,Y+2)
61 LINE(X-16,Y+16)-(X-11,Y+12),P
SET
62 DRAW"BM"+STR$(X-13)+","+STR$(
Y-4)+";L7U20R35D5L30D9"
63 CIRCLE(X-2,Y+2),15,3,1,.6,.37
64 PAINT(X+15,Y+2),3,3
65 RETURN
70 CIRCLE(X-2,Y+3),18,3,1,.65,.4
7:PRESET(X-2,Y-15):PRESET(X-2,Y-
14):PRESET(X+16,Y+3):PRESET(X-2,
Y+21):PRESET(X-2,Y+20)
71 CIRCLE(X-2,Y-10),18,3,1,.55,.
9:PRESET(X-2,Y-28):PRESET(X-2,Y-
27)
72 CIRCLE(X-2,Y+3),13,3:CIRCLE(X
-2,Y-10),13,3,1,.55,.88
73 LINE(X-18,Y+5)-(X-18,Y-14),PS
ET
74 LINE(X+4,Y-18)-(X+8,Y-19),PSE
T
75 PAINT(X-15,Y+2),3,3
76 RETURN
80 DRAW"BM"+STR$(X+20)+","+STR$(
Y-25)+";L40D5R35"
81 LINE(X+20,Y-25)-(X+5,Y+20),PS
ET:LINE-(X-2,Y+20),PSET:LINE-(X+
13,Y-20),PSET
82 PAINT(X-15,Y-23),3,3
83 RETURN
90 CIRCLE(X,Y-9),10,3:PRESET(X,Y
+1):PRESET(X,Y)
91 CIRCLE(X,Y+7),10,3:PRESET(X,Y
-3):PRESET(X,Y-2)
92 CIRCLE(X,Y-5),20,3,1,.54,.97:
CIRCLE(X,Y+3),20,3,1,.03,.47:PRE
SET(X,Y-25):PRESET(X,Y-24):PRESE
T(X-20,Y-5):PRESET(X,Y+23):PRESE
T(X,Y+22)
93 LINE(X+19,Y-6)-(X+14,Y-1),PSE
T:LINE-(X+19,Y+4),PSET
94 LINE(X-18,Y-6)-(X-14,Y-1),PSE
T:LINE-(X-18,Y+4),PSET
97 PAINT(X-15,Y-5),3,3
98 RETURN
100 CIRCLE(X,Y-10),18,3,1,.15,.9
9:PRESET(X,Y-28):PRESET(X,Y-27):
PRESET(X,Y+8):PRESET(X,Y+7):PRES
ET(X-18,Y-10)
101 CIRCLE(X,Y+3),18,3,1,.02,.4:
PRESET(X,Y+21):PRESET(X,Y+20)
102 CIRCLE(X,Y-10),13,3,1:CIRCLE
```

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RAINBOW ON DISK and RAINBOW ON TAPE are not stand-alone products, but are intended as adjuncts and complements to the magazine. Even if you purchase RAINBOW ON DISK or RAINBOW ON TAPE, you will still need the magazine for loading and operating instructions. For information on RAINBOW ON TAPE, see Page 110.

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```
(X,Y+3),13,3,1,0,.4
103 LINE(X+16,Y+5)-(X+16,Y-14),P
SET
104 LINE(X-10,Y+13)-(X-7,Y+9),PS
ET
105 PAINT(X,Y+4),3,3
106 RETURN
139 '*** THE ROUTINE FOR SELECTI
NG RANDOM NUMBERS
140 PMODE 3,1:SCREEN 1,0:PCLS:CO
LOR 3
150 BL=RND(-TIMER):O=RND(GN)
160 Y=30:X=100:SW=0
170 ON O GOSUB 20,30,40,50,60,70
,80,90,100,10
180 T=RND(GN)
190 Y=80:N=1:CC=0
200 ON T GOSUB 20,30,40,50,60,70
,80,90,100,10
210 IF O+T>9 THEN X=60 ELSE X=10
0
220 Y=140
230 LINE(10,105)-(170,110),PSET,
BF:LINE(50,60)-(55,85),PSET,BF:L
INE(40,70)-(65,75),PSET,BF
240 TT=O+T:O$=STR$(TT)
250 PLAY"O5L200ABABABABABABCCC"
299 '*** KEYBOARD CHECK FOR THE
 ANSWER
300 A$=INKEY$
310 SW=SW+1:IF SW=1000 THEN 1
320 COLOR C
330 LINE(X-25,Y-25)-(X+25,Y+25),
PSET,B
340 C=C+1:IF C>4 THEN C=2
350 IF A$="" THEN 300 ELSE 360
360 COLOR 1:LINE(X-25,Y-25)-(X+2
5,Y+25),PSET,B
370 COLOR 3
380 IF MID$(O$,N+1,1)=A$ THEN 40
0 ELSE 390
390 CC=CC+1:IF CC=2 THEN 600 ELS
E 300
400 A=INSTR("0123456789",A$)
410 ON A GOSUB 10,20,30,40,50,60
,70,80,90,100
420 C$=C$+A$
430 IF VAL(C$)=VAL(O$) THEN 500
ELSE 440
440 X=X+40:N=N+1
450 GOTO 300
500 O$="":A$="":C$="":TT=0
510 FOR E=1 TO 200:NEXT E
520 GOSUB 800
530 ANS=ANS+1:IF ANS=5 THEN 1300
 ELSE 150
```

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```
599 '*** THE HELP SCREEN
600 U=7:I=185:FOR W=1 TO O
610 COLOR 2
620 CIRCLE(U,I),6:PAINT(U,I),2,2
630 U=U+13
640 NEXT W
650 LINE(U-4,I)-(U+4,I),PSET:LIN
E(U,I-4)-(U,I+4),PSET
660 U=U+13
670 FOR W=1 TO T
680 CIRCLE(U,I),6:PAINT(U,I),2,2
690 U=U+13
700 NEXT W
710 CC=0
720 COLOR 3
730 GOTO 300
799 '*** THE STAR
800 H=215:V=35
810 COLOR C
820 LINE(H-9,V-13)-(H,V-35),PSET
:LINE-(H+9,V-13),PSET
830 LINE(H+9,V-13)-(H+35,V-13),P
SET:LINE-(H+15,V+10),PSET
840 LINE(H+15,V+10)-(H+25,V+35),
PSET:LINE-(H,V+17),PSET
850 LINE(H,V+17)-(H-25,V+35),PSE
T:LINE-(H-15,V+5),PSET
860 LINE(H-15,V+5)-(H-35,V-13),P
SET:LINE-(H-9,V-13),PSET
870 PAINT(H,V-32),C,C
880 IF FLAG=1 THEN RETURN
890 COLOR 3
900 PLAY"O5L255AABBCBBAEDDABCAAB
BCB"
910 FOR WT=1 TO 1000:NEXT WT
920 PCLS:RETURN
1000 'RERUN GAME
1010 PCLS
1020 N=1:CC=0:A$="":O$="":TT=0:A
NS=0
1030 GOTO 150
1100 'TITLE SCREEN
1110 CLEAR:CLS(3)
1120 FOR TL=1 TO 2
1130 PRINT @TS,"";
1140 FOR TN=1 TO 8
1150 PRINT TN;"+";
1160 NEXT TN
1170 TS=448
1180 NEXT TL
1190 PRINT @105,"   KIDSMATH   "
;
1200 PRINT @137,"      BY      "
;
1210 PRINT @169,"JOHN COLLICOTT"
;
1220 PRINT @201," INMAN,KANSAS "
;
1230 PRINT @233," JAN. 17,1986 "
;
1240 PLAY"T4O4L4DDL8DCO3B-GL2FB-
O4L4CCL8DCO3B-O4L8DL2.CO3L8FE-DF
B-O4CO3L4B-L8B-AGAB-GL4FO4L8DCO3
L8B-AB-GAFAO4CO3L1B-"
1250 FOR X=1 TO 1000:NEXT X
1260 CLS
1270 GN=9
1280 GOTO 140
1299 '*** FIVE STAR SCREEN
1300 PCLS
1310 FLAG=1
1320 C=2:H=35:V=35
1330 GOSUB 810
1340 C=3:H=215:V=35
1350 GOSUB 810
1360 C=4:H=35:V=155
1370 GOSUB 810
1380 C=2:H=215:V=155
1390 GOSUB 810
1400 C=2:H=125:V=95
1410 GOSUB 810
1420 FLAG=0
1430 PLAY"T4O3L4AL8AAL4ABAF#L2DL
4AL8AAL4AF#L4DDEF#O4DL8DDL4DEDO3
BL2GO4L4DL8DDL4C#O3BL2AL4ABL2AL4
AGL2F#L4F#EL1D"
1440 FOR WAT=1 TO 1000:NEXT WAT
1450 COLOR 3
1460 GOTO 1000
```

One-Liner Contest Winner . . .

Try this vacation planning helper before your next road trip. Just answer the prompts and let your CoCo give you the answers.

The listing:

```
0 CLS0:INPUT"ROUND TRIP MILES";D
:INPUT"AV.MPH";S:INPUT"AV.MPG";F
:INPUT"EST.$/GAL.";C:INPUT"# NIG
HTS";Y:PRINT"$/night":INPUT"LODG
ING";L:INPUT"FOOD";E:INPUT"MISC"
;M:PRINTD/S"HRS.DRIVING - TOTAL
COST":PRINTUSING"$$###.##";D/(F*
C)+(L+E+M)*Y:'VISIT ALBERTA
```

Barry Wiedman
Edmonton, Alberta

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape.*)

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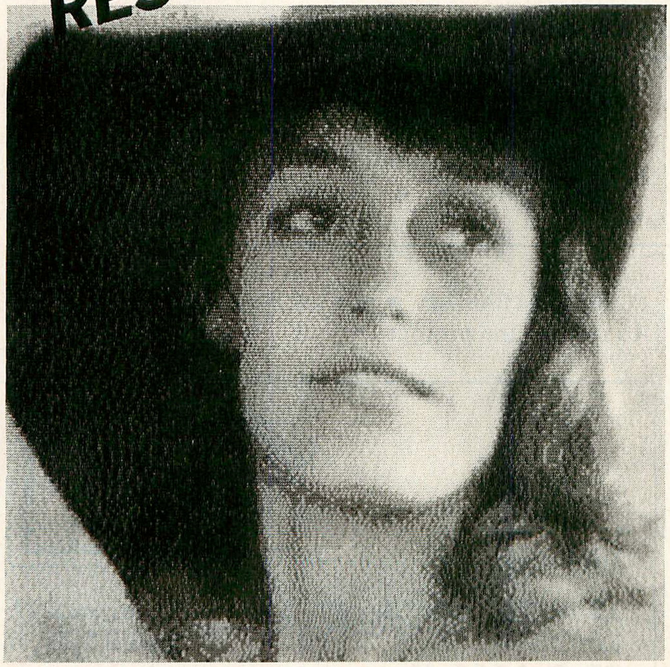

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Counting With Caesar

By Thomas Hood

For formality, decoration and distinctiveness, nothing beats Roman numerals. *Romans* provides an opportunity to develop and refresh skill in using them. It converts the numerals from Arabic to Roman and vice versa, and also has a drill option.

The standard short form is assumed in the program. For example, 40 must be represented by XL and not by XXXX.

The level of difficulty in the drill option may be controlled by altering the value of the number in Line 630. A beginner might be best served by a low value, say 17, which can be increased as the numerals are mastered, but this number cannot exceed 3,999.

If the CLEAR key is pressed by mistake, press ENTER to recover the prompt.

Tom Hood likes to use the Color Computer in his avocation of cryptanalysis. He lives in Dover, North Carolina and designs programs for his niece and nephew.

```
210 ......168
420 ......213
660 .......30
END ......82
```

The listing: ROMANS

```
10 REM romans xv march mcmlxxxvi
20 DATA1,I,5,V,10,X,50,L,100,C,5
00,D,1000,M
30 FORI=0TO6:READV(I),D$(I):NEXT
40 GOTO800 'menu
50 PRINT"   (ENTER AN @ FOR MAIN
MENU)":PRINT:RETURN
60 REM arabic-->roman
70 CLS:PRINTTAB(8)"MAXIMUM=3999"
80 PRINT:GOSUB50
90 LINEINPUT"ARABIC NUMERAL: ";N
$:IFN$=""THENSOUND100,1:GOTO90
100 IFN$="@"THENRETURN
110 F=1:LL=LEN(N$)
120 FORI=1TO LL:J$=MID$(N$,I,1)
130 IFJ$<"0"OR J$>"9"THENF=0:I=L
L
140 NEXT:IFF=0 THENPRINT"DIGITS
ONLY,PLEASE.":SOUND100,1:GOTO90
150 N=VAL(N$):IFN<1 OR N>3999 TH
ENPRINT"OUT OF RANGE.":SOUND100,
1:GOTO90
160 GOSUB190 'get-r$
170 PRINTR$:GOTO90
180 ' make-roman
190 R$=""
200 B=1000:O=6
210 IFN>=B THENN=N-B:R$=R$+D$(O)
:GOTO210
220 IFN=0THENRETURN
230 B=B/10:O=O-2:IFB>N GOTO230
240 C=0
250 IFN>=B THENN=N-B:C=C+1:GOTO2
50
260 IFC=9THENR$=R$+D$(O)+D$(O+2)
:GOTO290ELSEIFC>=5THENR$=R$+D$(O
+1):C=C-5:IFC=0THEN290
270 IFC=4THENR$=R$+D$(O)+D$(O+1)
:GOTO290
280 R$=R$+STRING$(C,D$(O))
290 IFN>0THEN230
300 RETURN
310 REM roman-->arabic
320 CLS:PRINTTAB(7)"MAXIMUM=MMMC
MXCIX":PRINT
330 GOSUB50
340 LINEINPUT"ROMAN NUMERAL: ";R
N$
350 IFRN$=""THENSOUND100,1:GOTO3
40
360 IFRN$="@"THENRETURN
370 F=1:GOSUB420:IFF=0THEN340 'e
val-rn$
380 GOSUB550:IFF=0THEN340 'valid
ate-rn$
390 PRINTRN
400 GOTO340
410 ' eval-rn$
420 RN=0:V1=0
430 FORI=LEN(RN$)TO 1 STEP-1
440 C$=MID$(RN$,I,1)
450 FORC=0TO6
460 IFC$=D$(C)THENV2=V(C):GOTO50
0
470 NEXTC
480 PRINT"'";C$;"'";" IS NOT A R
OMAN NUMERAL.":F=0:RETURN
490 'eval-chars
500 IFV2<V1 THENRN=RN-V2 ELSERN=
RN+V2
510 V1=V2
520 NEXTI
530 RETURN
540 'validate-rn$
550 IFRN<1 OR RN>3999 THENGOSUB5
80:RETURN
560 N=RN:GOSUB190:IFRN$<>R$THEN:
GOSUB580:RETURN
570 RETURN
580 SOUND100,1:PRINT"THIS IS NOT
 STANDARD FORM.":F=0:RETURN
590 REM DRILL
600 CLS:PRINT@12,"DRILL":PRINT:G
OSUB50
610 N=RND(-TIMER)
620 A=0
630 ANS=RND(3999):REM ans range
640 A=(A=0):IFA=0 THEN720
650 N=ANS:GOSUB190
660 PRINT"ROMAN FOR"ANS"?"
670 LINEINPUTRN$
680 IFRN$="@"THENRETURN
690 IFR$<>RN$ THENSOUND100,1:GOT
O660
700 PLAY"V15T12O3 L2CL4CCL2DL4GG
O4L2C"
710 GOTO630
720 N=ANS:GOSUB190
730 PRINT"ARABIC FOR "R$"?"
740 LINEINPUTRN$
750 IFRN$="@"THENRETURN
760 N=VAL(RN$):IFN<>ANS THENSOUN
D100,1:GOTO730
770 PLAY"V15T8O3 L4D+FL2F+FD+"
780 GOTO630
790 'menu
800 CLS0:PRINT@41,"ROMAN NUMERAL
S";
810 PRINT@32*5,"1. ARABIC TO ROM
AN";
820 PRINT@32*7,"2. ROMAN TO ARAB
IC";
830 PRINT@32*9,"3. DRILL";
840 PRINT@32*11,"4. END";
850 PRINT@32*15,"PRESS A NUMBER"
;
860 K$=INKEY$:IFK$=""THEN860
870 ONVAL(K$)GOSUB70,320,600,880
:GOTO800
880 CLS:PRINT@32*8+6,"ROMAN NUME
RALS ENDED":PRINT@32*13,"":END:R
ETURN
```

32K
Disk

Plottin' and Plannin'

Spreadsheets have never been so simple

By Bill Reed

When I first saw a BASIC spreadsheet program and put it on my computer, I really liked it, but there were a lot of features I wanted in a spreadsheet program that this one didn't have. The program was written in a way that made changes difficult, if not impossible, so I decided to write my own spreadsheet program.

Cheap Spread is written in a modular style, so that the program is broken down into small, manageable blocks which can be easily changed. When I first wrote it, I wrote "program stubs" for the parts not yet written. In this way I could check out the program as I wrote new subroutines. This also makes it easy to replace subroutines or add new ones.

There are messages throughout this program to inform you of an error in the command name operands, and even to tell you of errors in setting up functions. But not all messages are for errors. Some are for requesting more information, such as how many rows and columns of the spreadsheet to print. These messages help the program to be user-friendly.

I wrote an `INKEY$` subroutine to control data input for at least two reasons. First, this prevents you from entering too much data in cells; you are limited to only nine characters. If you enter more than that, it is written over by the next cell or wraps around to the next line. Second, it prevents a line feed after you press `ENTER`, which you get with the `INPUT` command in BASIC. This can be especially annoying on the last line of a screen when it causes the entire screen to scroll up a line. You may use any key to enter data. Backspace works as normal, `SHIFT`-backspace backs up to the beginning of a field, and the right arrow works the same as pressing the space bar. The `INKEY$` routine controls cursor movement so that you do not enter more data than is allowed, and it prevents backspacing past the beginning of a field.

Statements preceding the `GOSUB` to the `INKEY$` subroutine set the length of the field (`LN`), whether you can enter any key or numeric keys only (`TY$`), and the start position for entering data (`S9`). The `INKEY$` subroutine calculates the end position, and checks it to make sure that you do not enter data past it. The statement after the `GOSUB` moves the temporary variable `C9$` to the actual value you want to save. For a numeric field, the variable `C9` is used.

Sometimes the program seems to be hung up when it does not respond to a keypress, but it is only stopping to clear more space for strings. This is known as "garbage collection." This occurs more frequently using a large spreadsheet, but not so often as to be a problem.

Bill Reed is a systems analyst for a large manufacturing firm in Lavergne, Tennessee. His hobbies include camping and other outdoor activities.

Starting Out

When you first start the program, you are asked if you want to create or load a spreadsheet. If you create a spreadsheet, you are then asked to enter the number of rows and columns. Pressing ENTER at these points gives the defaults of 40 rows and 14 columns. This is about the maximum number of cells that you can use. I set the default to 14 columns so you can have a column for titles, 12 months of data and a totals column. I frequently use this spreadsheet program for doing my monthly budget and it works out very well.

> **"Expressions . . . are evaluated in algebraic notation."**

If you load a spreadsheet you are asked the name of the spreadsheet file. If you do not enter an extension on the filename, the program automatically adds `/DAT` to the filename.

Cells are referred to by the row number, followed by a comma or a dash, then the column number. Functions entered for a cell are evaluated in algebraic notation. That is, exponentiation is done first, followed by multiplication and division, then addition and subtraction. Parentheses may be used to change the order of operations. This function evaluation routine works in the same way as many higher-level language compilers running on mainframe computers.

In evaluating functions, mathematical expressions go through a conversion process so that they are evaluated in algebraic notation. This process uses a variable array (`V$`), and a stack for the mathematical operators (`SK$`). The stack is used as a holding place for the operators while the proper sequence is established for them. Then they are transferred to the variable array. After the entire function is scanned, the calculations are done. For example, an expression entered as:

```
[5,3]+[5,5]*[6,5]
```

is converted before calculations to:

```
[5,3] [5,5] [6,5] * +
```

This format is known as postfix notation. Hewlett-Packard calculators use this notation.

The program has room to accommodate up to 10 variables and 10 operators per function, as determined by the dimension of the array `V$`. The length of the function entered is limited to 30 characters, but if you need more than that, change the length (`LN`) in the first line of the Enter Function subroutine.

The commands in *Cheap Spread* include the following:

DAT r,c — Enter the row and column for entering data in a cell.

F r,c — Enter function for a row and column. Functions can be entered in many formats. The first and easiest is Rn1,n2 or Cn1,n2 which specifies row or column summation. 'R' takes the sum of rows n1 through n2. 'C' sums columns n1 through n2. Calculations involving cells are referred to by surrounding the row and column numbers by brackets. The left bracket is generated using the SHIFT-down arrow, and the right bracket by the SHIFT-right arrow. You can use any combination of cells and constants in functions. For example: R2,3; C3-6; [5,3]+[5,4]/[5,5]; [5,3]/[5,4]+1; [5,5]; and 3+2*5.

V r,c — View function at row and column specified. It is not necessary for the cell to be on the screen.

VF — View all the functions defined on the screen. Instead of data being displayed, functions are displayed.

I r,c — Increment a cell. You are asked to enter the amount that you want to add to the value already in the cell.

D r,c — Decrement a cell. You are asked to enter the amount that you want to subtract from the value already in the cell.

CC c1-c2 — Copy column of data from c1 to c2. The first column must be on the screen, but the second column specified need not be on the screen.

CR r1-r2 — Copy rows of data from r1 to r2. The first row must be on the screen, but the second row need not be on the screen.

H — Displays a help screen. Pressing any key returns you to the same point in the spreadsheet.

P — Sends the spreadsheet to the printer. If you select standard size print, the maximum number of columns you may specify is eight. The maximum number of columns is not checked for narrow print, but if you use the default size spreadsheet, you should not have any problem.

SPREAD r,c — Takes the value in a cell and spreads it to one or more columns. You may enter a whole number between 1 and the maximum number of columns. The starting cell will be divided by this number, and the result will be put into the number of cells specified. You may also enter a number between .001 and 1, and this will divide the value in the cell by the fractional amount and put the result in just that one cell. You can use this to double the value in a cell by entering .5 as the number of columns to spread.

U — Updates the spreadsheet. Updating is done a column at a time, starting at the first column on the left. If you have formulas that depend on a value in a higher numbered row in the same column, you *may need to update the spreadsheet more than once* to obtain correct results.

ERASE — Clears all data and functions. You are asked what row and column on which to start erasing. This is done so you can leave your row and column headings on the spreadsheet.

CLRD — Clears all data from the spreadsheet, leaving all the functions intact.

J r,c — Jump to specified row and column. This puts the specified row and column in the upper left corner of your screen. This is especially useful for jumping to the first column to see what the title for a particular row is, and then jumping back.

S — Save spreadsheet. You are asked if you want to replace the existing spreadsheet or save a new one. When saving a new spreadsheet, if you leave off the file extension, the program will automatically add `/DAT` to the file name. Data is saved in the following manner: First, the number of rows and columns are written to the file. Then, all the data in the cells are written out one column at a time, starting with the first column. Finally, all the functions are written out one column at a time, starting with the first column.

The printer options in *Cheap Spread* are for an Okidata printer. If you have a different printer, you may need to refer to your printer manual for correct control codes for standard and narrow print. The variable that has the control code for printing is `SZ$`. The baud rate for printing is set for 1200 baud. If your printer baud rate is different, either delete or change the `POKE 150, 41` in the initialization subroutine. ☐

200	71	6530	211	12520	138
520	66	7090	236	13650	190
770	245	7660	212	14540	217
1590	201	8170	190	15530	151
2110	173	9040	238	16060	163
3040	155	10590	29	END	173
4525	38				

The listing: SPREAD

```
10 CLEAR 7000
20 PMODE0,1:PCLEAR 1
30 GOSUB 500:'INITIALIZE
40 GOSUB 8000:'HELP SCREEN
50 GOSUB 10000:'DISPLAY SCREEN
60 GOSUB 1000:'ENTER DATA
70 GOSUB 2000:'CHECK COMMAND
80 IF ER$<>"" THEN GOSUB 9500:GO
TO 60:'ERROR
90 IF CN>9 THEN 160
100 GOSUB 2500:'VALID ROW AND DE
LIMITER?
110 IF ER$<>"" THEN GOSUB 9500:G
OTO 60:'ERROR
120 GOSUB 3000:'VALID COLUMN?
130 IF ER$<>"" THEN GOSUB 9500:G
OTO 60:'ERROR
140 IF CN<6 OR CN=8 OR CN=9 THEN
 GOSUB 3500:'IS CELL ON SCREEN?
150 IF ER$<>"" THEN GOSUB 9500:G
OTO 60:'ERROR
160 IF CN=1 THEN GOSUB 4000:'ENT
ER DATA
170 IF CN=2 THEN GOSUB 4500:GOSU
B 10000:'ENTER FUNCTION
180 IF CN=3 THEN GOSUB 12500:GOS
UB 10000:'INCREMENT CELL
190 IF CN=4 THEN GOSUB 13000:GOS
UB 10000:'DECREMENT CELL
200 IF CN=5 THEN GOSUB 9000:GOSU
B 10000:'SPREAD FIGURES
210 IF CN=6 THEN GOSUB 5000:'VIE
W FUNCTION
220 IF CN=7 THEN GOSUB 11000:GOS
UB 10000:'MOVE WINDOW
230 IF CN=8 THEN GOSUB 5500:GOSU
B 10000:'COPY ROWS
240 IF CN=9 THEN GOSUB 6000:GOSU
B 10000:'COPY COLUMNS
250 IF CN=10 THEN GOSUB 6500:'PR
INT SPREADSHEET
260 IF CN=11 THEN GOSUB 7500:'SA
VE SPREADSHEET
270 IF CN=12 THEN GOSUB 8000:GOS
UB 10000:'HELP SCREEN
280 IF CN=13 OR CN=14 THEN GOSUB
 8500:GOSUB 10000:'CLR DATA/ALL
290 IF CN=15 THEN GOSUB 11500:GO
SUB 10000:'UPDATE SPREADSHEET
300 IF CN=16 THEN GOSUB 16500:'V
IEW FUNCTIONS ON SCREEN
310 IF CN<>17 THEN 60
320 PRINT@32,"QUIT. ARE YOU SURE
 (Y/N)";:INPUT YN$:IF YN$<>"Y" TH
EN 60
330 END
```

Two-Liner Contest Winner . . .

This Two-Liner creates cassette index cards on your printer. Just type it in, run it and answer the prompt for the number of cards you desire. Then just fold the printout on the dotted lines and fill it in.

The listing:

```
1 CLS:INPUT"HOW MANY CARDS";D:FO
RA=1TOD:Z$="---------------------
--------------------":PRINT#-2,Z
$:PRINT#-2,":SIDE 1;
:SIDE 2;":FORX=1TO14:PRINT#-2,":
                   :
      :":NEXTX:PRINT#-2,Z$:PRINT
#-2,":TITLE;":PRINT#-2,":"
2 PRINT#-2,Z$:PRINT#-2,":NOTES;"
:FOR X=1TO4:PRINT#-2,":
                             :":
NEXTX:PRINT#-2,Z$:NEXTA
```

Keith Selbee
Akron, OH

(For this winning two-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape.*)

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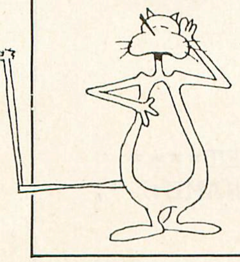
```
500 '*****INITIALIZATIONS*****
510 CUR$=CHR$(175):POKE 150,41
520 BD$=CHR$(150)
530 DC=1:DR=1
540 NM$="0123456789.":OP$="^*/-+
()"
550 V1$="0123456789.^*/+-[]()"
560 FOR I=1 TO 6
570 READ P1(I),P2(I)
580 NEXT I
590 DATA 3,4,2,2,2,2,1,1,1,1,0,4
600 NC=17:DIM VC$(NC),V$(20)
610 FOR I=1 TO NC
620 READ VC$(I)
630 NEXT I
640 DATA DAT,F,I,D,SPREAD,V,J,CR
,CC,P,S,H,ERASE,CLRD,U,VF,Q
650 CLS4
660 BN$=BD$+STRING$(22,32)+BD$
670 PRINT@32+4,STRING$(24,150);
680 PRINT@2*32+4,BD$+"     CHEAP
 SPREAD     "+BD$;
690 PRINT@3*32+4,BD$+"A SPREADSH
EET PROGRAM "+BD$;
700 PRINT@4*32+4,BN$;
710 PRINT@5*32+4,BD$+"     BY BI
LL REED     "+BD$;
740 PRINT@6*32+4,STRING$(24,150)
;
750 PRINT@11*32+4,"LOAD OR CREAT
E (L/C)";:INPUT LC$
760 IF LC$="L" THEN GOSUB 7000:G
OSUB 10000:GOTO 810
770 IF LC$<>"C" THEN 750
780 PRINT@13*32+4,"# OF ROWS(DEF
AULT=40)";:INPUT MR:IF MR=0 THEN
 MR=40
790 PRINT@14*32+4,"# OF COLS(DEF
AULT=14)";:INPUT MC:IF MC=0 THEN
 MC=14
800 DIM C$(MR,MC),FC$(MR,MC)
810 RETURN
1000 '*****ENTER COMMAND*******
1010 PRINT@0,STRING$(64,32);
1020 PRINT@0,">";
1030 S9=2:LN=30:GOSUB 1500:IP$=C
9$:'INKEY$ INPUT
1040 RETURN
1500 '**INKEY$ INPUT ROUTINE***
1510 PS=S9:E9=S9+LN:C9$=""
1520 PRINT@PS,CUR$;
1530 C8$=INKEY$:IF C8$="" THEN 1
530 ELSE C8=ASC(C8$)
1540 IF C8=8 OR C8=9 OR C8=13 OR
 C8=21 OR C8>31 THEN 1550 ELSE 1
530
1550 IF C8<>13 THEN 1570
1560 PRINT@PS," ";:C9=VAL(C9$):R
ETURN
1570 IF C8<>8 THEN 1612
1580 IF PS=S9 THEN 1530
1590 IF LEN(C9$)>1 THEN C9$=LEFT
$(C9$,LEN(C9$)-1) ELSE C9$=""
1600 PRINT@PS," ";:PS=PS-1
1610 GOTO 1520
1612 IF C8<>21 THEN 1620
1614 IF PS=S9 THEN 1530
1616 C9$="":PRINT@S9,STRING$(LN+
1,32);:PS=S9:GOTO 1520
1620 IF C8<>9 THEN 1670
1630 IF PS=E9 THEN 1530
1640 PRINT@PS," ";:PS=PS+1
1650 C9$=C9$+" "
1660 GOTO 1520
1670 IF PS=E9 THEN 1530
1680 IF TY$="N" AND INSTR("01234
56789.+-",C8$)=0 THEN 1530
1690 C9$=C9$+C8$
1700 PRINT@PS,C8$;:PS=PS+1
1710 GOTO 1520
2000 '******FIND COMMAND*******
2010 CM$=""
2020 'REMOVE BLANKS IN COMMAND
2030 FOR I=1 TO LEN(IP$)
2040 IF INSTR(NM$,MID$(IP$,I,1))
>0 THEN 2070
2050 IF MID$(IP$,I,1)<>" " THEN
CM$=CM$+MID$(IP$,I,1)
2060 NEXT I
2070 II=I
```



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```
2080 FOR I=1 TO NC
2090 IF CM$=VC$(I) THEN 2110
2100 NEXT I
2110 IF I>NC THEN ER$=CM$+" COMM
AND NOT FOUND"
2120 CN=I
2130 RETURN
2500 '**VALID ROW & DELIMITER?*
2510 O1$=""
2520 FOR I=II TO LEN(IP$)
2530 IF INSTR(NM$,MID$(IP$,I,1))
>0 THEN O1$=O1$+MID$(IP$,I,1) EL
SE 2550
2540 NEXT I
2550 II=I+1:O1=VAL(O1$)
2560 IF LEN(O1$)=0 THEN ER$="OPE
RAND 1 INVALID OR MISSING":GOTO
2600
2570 IF CN<9 AND O1>MR THEN ER$=
"MAX. NO. OF ROWS IS"+STR$(MR)
2580 IF CN=9 AND O1>MC THEN ER$=
"MAX. NO. OF COLS IS"+STR$(MC)
2590 IF MID$(IP$,I,1)<>"-" AND M
ID$(IP$,I,1)<>"," THEN ER$="DELI
MITER MUST BE '-' OR ','"
2600 RETURN
3000 '******CHECK COLUMN******
3010 O2$=""
3020 FOR I=II TO LEN(IP$)
3030 IF INSTR(NM$,MID$(IP$,I,1))
>0 THEN O2$=O2$+MID$(IP$,I,1) EL
SE 3050
3040 NEXT I
3050 II=I:O2=VAL(O2$)
3060 IF LEN(O2$)=0 THEN ER$="OPE
RAND 2 INVALID OR MISSING":GOTO
3090
3070 IF CN<>8 AND O2>MC THEN ER$
="MAX. NO. OF COLS IS"+STR$(MC)
3080 IF CN=8 AND O2>MR THEN ER$=
"MAX. NO. OF ROWS IS"+STR$(MR)
3090 RETURN
3500 '***IS CELL ON SCREEN?****
3510 IF CN<9 AND (O1>DR+13-1 OR
O1<DR) THEN 3550
3520 IF CN=9 AND (O1>DC+3-1 OR O
1<DC) THEN 3550
3530 IF CN<6 AND (O2>DC+3-1 OR O
2<DC) THEN 3550
3540 GOTO 3560
3550 ER$="CELL(S) NOT ON SCREEN"
3560 RETURN
4000 '***ENTER DATA IN CELL****
4010 S9=96+(O1-DR+1)*2+(O1-DR)*3
0+(O2-DC)*10:LN=9:GOSUB 1500:C$(
O1,O2)=C9$
4020 IF S9=502 THEN GOSUB 10000:
'REDISPLAY IF SCREEN SCROLLS
4030 RETURN
4500 '*****ENTER FUNCTION*****
4510 S9=32:LN=30:GOSUB 1500:FC$(
O1,O2)=C9$:IP$=C9$
4520 IF IP$="" THEN 4540
4525 IF LEFT$(IP$,1)="-" THEN FC
$(O1,O2)="":ER$="ENTER NEG. NO.
AS 0-NUMBER":GOSUB 9500:GOTO 454
0
4530 IF LEFT$(IP$,1)="C" OR LEFT
$(IP$,1)="R" THEN GOSUB 13500 EL
SE GOSUB 14000
4540 RETURN
5000 '*****VIEW FUNCTION******
5010 IF FC$(O1,O2)<>"" THEN PRIN
T@32,FC$(O1,O2) ELSE PRINT@32,"N
O FUNCTION DEFINED";
5020 GOSUB 12000:'PRESS ANY KEY
5030 RETURN
5500 '*******COPY ROWS********
5510 FOR I=1 TO MC
5520 C$(O2,I)=C$(O1,I)
5530 NEXT I
5540 RETURN
6000 '******COPY COLUMNS******
6010 FOR I=1 TO MR
6020 C$(I,O2)=C$(I,O1)
6030 NEXT I
6040 RETURN
6500 '****PRINT SPREADSHEET****
6510 PRINT@32,"STD PRINT OR NARR
OW(s/N)";:INPUT SZ$
6520 IF SZ$="N" THEN SZ$=CHR$(29
) ELSE SZ$=CHR$(30)
6530 PRINT@32,STRING$(30,32);
6540 PRINT@32,"ENTER START,END R
OW";:INPUT R1,R2
6550 PRINT@32,STRING$(30,32);
6560 PRINT@32,"ENTER START,END C
OL";:INPUT C1,C2
6570 IF SZ$=CHR$(30) AND C2-C1>8
 THEN ER$="CAN ONLY PRINT 8 COLS
 STD SIZE":GOSUB 9500:GOTO 6660
6580 ER$="READY PRINTER AND PRES
S ANY KEY":GOSUB 9500
6590 PRINT#-2,SZ$
6600 FOR I=R1 TO R2
6610 FOR J=C1 TO C2
6620 PRINT#-2,USING"%       %";C
$(I,J);
6630 NEXT J
6640 PRINT#-2,CHR$(13);
6650 NEXT I
6660 PRINT#-2,CHR$(30)
6670 RETURN
7000 '****LOAD SPREADSHEET****
7010 PRINT@13*32+4,"FILENAME: ";
:INPUT F$
```

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```
7020 IF INSTR(F$,"/")=0 AND INST
R(F$,".")=0 THEN F$=F$+"/DAT"
7030 OPEN"I",#1,F$
7040 INPUT#1,MR,MC
7050 DIM C$(MR,MC),FC$(MR,MC)
7060 FOR I=1 TO MR
7070 FOR J=1 TO MC
7080 INPUT#1,C$(I,J)
7090 NEXT J,I
7100 FOR I=1 TO MR
7110 FOR J=1 TO MC
7120 INPUT#1,FC$(I,J)
7130 NEXT J,I
7140 CLOSE#1
7150 RETURN
7500 '****SAVE SPREADSHEET****
7510 PRINT@32,"NEW FILE/REPL EXI
STING(N/R)";:INPUT NR$
7520 IF NR$="N" THEN PRINT@32,ST
RING$(30,32);:PRINT@32,"";:INPUT
"FILENAME: ";F$ ELSE IF NR$<>"R"
 THEN 7510
7530 IF INSTR(F$,"/")=0 AND INST
R(F$,".")=0 THEN F$=F$+"/DAT"
7540 IF NR$="R" THEN KILL F$
7550 OPEN"O",#1,F$
7560 WRITE#1,MR,MC
7570 FOR I=1 TO MR
7580 FOR J=1 TO MC
7590 WRITE#1,C$(I,J)
7600 NEXT J,I
7610 FOR I=1 TO MR
7620 FOR J=1 TO MC
7630 WRITE#1,FC$(I,J)
7640 NEXT J,I
7650 CLOSE#1
7660 RETURN
8000 '******HELP SCREEN*******
8020 CLS:PRINT@10,"CHEAP SPREAD"
;
8030 PRINT@2*32+2,"DATx,y- ENTER
 DATA IN CELL";
8040 PRINT@3*32+2,"SPREADx,y-SPR
EAD AMT TO COLS";
8050 PRINT@4*32+2,"Fx,y  - ENTER
 FUNCTION IN CELL";
8060 PRINT@5*32+2,"Vx,y OR VF -
VIEW FUNC";
8070 PRINT@6*32+2,"CCx,y - COPY
COLUMN";
8080 PRINT@7*32+2,"CRx,y - COPY
ROW";
8090 PRINT@8*32+2,"Ix,y  - INCR
 Dx,y - DECR";
8100 PRINT@9*32+2,"Jx,y  - JUMP
TO ROW,COL";
8110 PRINT@10*32+2,"ERASE - CLEA
R EVERYTHING";
8120 PRINT@11*32+2,"CLRD  - CLEA
R DATA ONLY";
8130 PRINT@12*32+2,"H - HELP
   Q  - QUIT"
8140 PRINT@13*32+2,"U - UPDATE
   S  - SAVE";
8150 PRINT@14*32+2,"P - PRINT
   ";
8160 PRINT@15*32+9,"PRESS ANY KE
Y";
8170 GOSUB 12000
8180 RETURN
8500 '***CLEAR DATA/FUNCTION***
8510 IF CN=13 THEN PRINT@32,"CLE
AR EVERYTHING(Y/N) ";
8520 IF CN=14 THEN PRINT@32,"CLE
AR ALL DATA(Y/N) ";
8530 INPUT YN$:IF YN$<>"Y" THEN
8620
8540 PRINT@32,"ENTER START ROW T
O CLEAR";:INPUT S2
8550 PRINT@32,"ENTER START COL T
O CLEAR";:INPUT S3
8560 FOR I=S2 TO MR
8570 FOR J=S3 TO MC
8580 C$(I,J)=""
8590 IF CN=13 THEN FC$(I,J)=""
8600 NEXT J
8610 NEXT I
8620 RETURN
9000 '*****SPREAD FIGURES*****
9010 PRINT@32,"HOW MANY COLUMNS"
;:INPUT CL
9020 IF CL>MC-O2+1 THEN ER$="MAX
 NO. OF COLUMNS IS"+STR$(MC-O2+1
):GOSUB 9500:GOTO 9070
9030 O3=(VAL(C$(O1,O2)))/CL:O3=I
NT(O3*100+.5)/100
9040 FOR J=O2 TO INT(O2+CL+.999)
-1
9050 C$(O1,J)=STR$(O3)
9060 NEXT J
9070 RETURN
9500 '***PRINT ERROR MESSAGES**
9510 PRINT@32,ER$;
9520 ER$=""
9530 GOSUB 12000
9540 RETURN
10000 '*****DISPLAY SCREEN*****
10010 GOSUB 10500
10020 FOR I=1 TO 13
10030 FOR J=1 TO 3
10040 IF J+DC-1>MC THEN 10080
10050 IF I+DR-1>MR THEN 10090
10060 PRINT@96+(I-1)*30+I*2+(J-1
)*10,C$(I+DR-1,J+DC-1);
10070 NEXT J
10080 NEXT I
```

```
10090 RETURN
10500 '***ROW & COL HEADERS***
10510 CLS
10520 FOR I=1 TO 3
10530 PRINT@66+(I-1)*10,DC+I-1;
10540 NEXT I
10550 FOR I=1088 TO 1119
10560 IF PEEK(I)>63 THEN POKE I,
PEEK(I)-64
10570 NEXT I
10580 FOR I=1 TO 13
10590 PRINT@64+(I*32),RIGHT$(STR
$(I+DR-1),2);
10600 NEXT I
10610 FOR I=1120 TO 1504 STEP 32
10620 IF PEEK(I)>63 THEN POKE I,
PEEK(I)-64
10630 IF PEEK(I+1)>63 THEN POKE
I+1,PEEK(I+1)-64
10640 NEXT I
10650 RETURN
11000 '*****MOVE WINDOW******
11010 DR=O1:DC=O2:RETURN
11500 '***UPDATE SPREADSHEET***
11510 PRINT@32,"UPDATING...";
11520 FOR C1=1 TO MC
11530 FOR R1=1 TO MR
11540 IF FC$(R1,C1)="" THEN 1156
0
11550 IP$=FC$(R1,C1):O1=R1:O2=C1
:GOSUB 4530
11560 NEXT R1,C1
11570 RETURN
12000 '*****PRESS ANY KEY******
12010 I$=INKEY$:IF I$="" THEN 12
010
12020 RETURN
12500 '*****INCREMENT CELL*****
12510 PRINT@32,"ENTER INCREMENT"
;:INPUT IX
12520 O3=VAL(C$(O1,O2))+IX
12530 C$(O1,O2)=STR$(O3)
12540 RETURN
13000 '*****DECREMENT CELL*****
13010 PRINT@32,"ENTER DECREMENT"
;:INPUT DX
13020 O3=VAL(C$(O1,O2))-DX
13030 C$(O1,O2)=STR$(O3)
13040 RETURN
13500 '**SUM ROWS OR COLUMNS**
13510 O3=O1:O4=O2
13520 II=2:GOSUB 2500
13530 IF LEFT$(IP$,1)="C" AND O1
>MC THEN ER$="MAX. NO. OF COLS I
S";STR$(MC) ELSE ER$=""
13540 IF ER$<>"" THEN GOSUB 9500
:GOTO 13700
13550 GOSUB 3000
13560 IF LEFT$(IP$,1)="R" AND O2
>MR THEN ER$="MAX. NO. OF ROWS I
S";STR$(MR) ELSE ER$=""
13570 IF ER$<>"" THEN GOSUB 9500
:GOTO 13700
13580 VL=0
13590 IF LEFT$(IP$,1)="C" THEN 1
3600 ELSE 13650
13600 '*****SUM COLUMNS*****
13610 FOR I=O1 TO O2
13620 VL=VL+VAL(C$(O3,I))
13630 NEXT I
13640 GOTO 13690
13650 '*****SUM ROWS********
13660 FOR I=O1 TO O2
13670 VL=VL+VAL(C$(I,O4))
13680 NEXT I
13690 C$(O3,O4)=STR$(VL)
13700 RETURN
14000 '**BREAK DOWN FUNCTION***
14010 VN=0:TS=0:SK$=""
14020 FOR I=1 TO LEN(IP$)
14030 I9$=MID$(IP$,I,1)
14040 IF I9$="[" THEN GOSUB 1450
```

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```
0:GOTO 14070
14050 IF INSTR(NM$,I9$)>0 THEN G
OSUB 15000:GOTO 14070
14060 IF INSTR(OP$,I9$)>0 THEN G
OSUB 15500
14070 IF ER$<>"" THEN GOSUB 9500
:GOTO 14120
14080 IF INSTR(V1$,I9$)=0 THEN E
R$="INVALID CHARACTER":GOSUB 950
0:GOTO 14120
14090 NEXT I
14100 IF TS>0 THEN GOSUB 15500
14110 GOSUB 16000:'EVAL FUNCT
14120 RETURN
14500 '*****EVALUATE CELL******
14510 O3$="":O4$=""
14520 I=I+1
14530 IF I>LEN(IP$) THEN 14610
14540 I9$=MID$(IP$,I,1)
14550 IF INSTR(NM$,I9$)>0 THEN O
3$=O3$+I9$:I=I+1:GOTO 14530
14560 IF I9$<>"-" AND I9$<>"," T
HEN ER$="DELIMITER MUST BE '-' O
R ','":GOTO 14660
14570 I=I+1
14580 IF I>LEN(IP$) THEN 14610
14590 I9$=MID$(IP$,I,1)
14600 IF INSTR(NM$,I9$)>0 THEN O
4$=O4$+I9$:I=I+1:GOTO 14580
14610 IF I9$<>"]" THEN ER$="MISS
ING RIGHT BRACKET":GOTO 14660
14620 O3=VAL(O3$):O4=VAL(O4$)
14630 IF O3>MR THEN ER$="MAX. NO
. OF ROWS IS"+STR$(MR)
14640 IF O4>MC THEN ER$="MAX. NO
. OF COLS IS"+STR$(MC)
14650 IF ER$="" THEN VN=VN+1:V$(
VN)=C$(O3,O4):IF V$(VN)="" THEN
V$(VN)=" "
14660 RETURN
15000 '****EVALUATE CONSTANT***
15010 N9$=""
15020 IF I>LEN(IP$) THEN 15050
15030 I9$=MID$(IP$,I,1)
15040 IF INSTR(NM$,I9$)>0 THEN N
9$=N9$+I9$:I=I+1:GOTO 15020
15050 VN=VN+1:V$(VN)=N9$:I=I-1
15060 RETURN
15500 '**PUSH/POP OPER STACK***
15510 IF I9$=")" THEN 15520 ELSE
 15610
15520 IF TS=0 THEN ER$="MISSING
LEFT PARENTHESIS":GOTO 15680
15530 TM$=MID$(SK$,TS,1)
15540 IF TM$="(" THEN 15550 ELSE
 15570
15550 TS=TS-1:IF TS=0 THEN SK$="
" ELSE SK$=LEFT$(SK$,TS)
15560 GOTO 15680
15570 VN=VN+1:V$(VN)=TM$
15580 TS=TS-1:IF TS=0 THEN SK$="
" ELSE SK$=LEFT$(SK$,TS):GOTO155
20
15600 '***PUT ON STACK?*******
15610 IF TS=0 THEN 15670
15620 TM$=MID$(SK$,TS,1)
15630 IF P1(INSTR(OP$,TM$))<P2(I
NSTR(OP$,I9$)) THEN 15670
15640 VN=VN+1:V$(VN)=TM$
15650 TS=TS-1:IF TS=0 THEN SK$="
" ELSE SK$=LEFT$(SK$,TS)
15660 GOTO 15610
15670 TS=TS+1:SK$=SK$+I9$
15680 RETURN
16000 '****EVAL IN POSTFIX****
16010 I=1
16020 IF VN=1 THEN 16170
16030 TM$=LEFT$(V$(I),1)
16040 IF INSTR(OP$,TM$)=0 THEN I
=I+1:GOTO 16030
16050 IF VAL(V$(I))<>0 THEN I=I+
1:GOTO 16030:'NUMBER
16060 IF TM$="^" THEN V$(I-2)=ST
R$(VAL(V$(I-2))^VAL(V$(I-1)))
16070 IF TM$="*" THEN V$(I-2)=ST
R$(VAL(V$(I-2))*VAL(V$(I-1)))
16080 IF TM$="/" THEN IF VAL(V$(
I-1))<>0 THEN V$(I-2)=STR$(VAL(V
$(I-2))/VAL(V$(I-1))) ELSE V$(I-
2)="0"
16090 IF TM$="+" THEN V$(I-2)=ST
R$(VAL(V$(I-2))+VAL(V$(I-1)))
16100 IF TM$="-" THEN V$(I-2)=ST
R$(VAL(V$(I-2))-VAL(V$(I-1)))
16110 IF I+1>VN THEN 16170
16120 FOR J=I+1 TO VN
16130 V$(J-2)=V$(J)
16140 NEXT J
16150 VN=VN-2
16160 GOTO 16010
16170 IF LEN(V$(1))>9 THEN V$(1)
=LEFT$(V$(1),9)
16180 C$(O1,O2)=V$(1)
16190 RETURN
16500 '**VIEW SCREEN OF FUNC***
16510 GOSUB 10500
16520 FOR I=1 TO 13
16530 FOR J=1 TO 3
16540 IF I+DR-1>MR THEN 16580
16550 XX$=FC$(I+DR-1,J+DC-1):IF
LEN(XX$)>9 THEN XX$=LEFT$(XX$,9)
16560 PRINT@96+(I-1)*30+I*2+(J-1
)*10,XX$;
16570 NEXT J
16580 NEXT I
16590 RETURN
```

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints, tips or responses to questions, or want help yourself, we encourage you to write to the Scoreboard, c/o THE RAINBOW.

FEEDBACK

Scoreboard:

Attention Erick Molnar: Yes, there are other exits from *Bedlam*! If the dog doesn't die, `SEARCH` each room until you find one with a painted door or a secret door. If the door is painted, `OPEN PAINTED DOOR`. If it's a secret door, bring Napoleon into the room (`NAPOLEON FOLLOW ME`) then have `NAPOLEON OPEN SECRET DOOR`.

To help Dale Lampe in *Pyramid 2000*: After you `GET DIAMONDS`, go North, West and `GET COINS`.

Bette A. Hatcher
Apple Valley, CA

Fill It to the Rim

Scoreboard:

Here is some information for Mark Bourdeaux about the stick in *Hall of Kings*. First you need to get the bucket and candle stub. Put the candle in the bucket; this stops up the hole in the bucket. Then go to the kitchen and fill the bucket with the water. After that, go to the pool and fill it with the water.

Arie Moller
Kensington, MD

Underground Trick

Scoreboard:

For Joseph J. McElheny: Enlist the aid of the camel in *Sands of Egypt*, he knows just where to go. You don't enter the pyramid in the obvious way; an underground tunnel would be just the trick.

James K. Knight
Marysville, WA

Cross Over the Bridge

Scoreboard:

Here are *Trekboer* tips for David Merkel. Tie the rope west of the bridge, then cross the bridge. Carry only three light objects, or you will die. Don't worry if the bridge collapses after you cross it. Hint: Spiders don't survive when in antimatter chambers.

How can I find a way to drink water in *Sands of Egypt*?

Luis Torres
Lima, Peru

Polarized

Scoreboard:

In answer to Sherry Moore's question about *Pyramid 2000*, you have to go North and South a lot in the maze. At a certain time (most likely after going North) go East — you will be at the brink of a pit. Go East and then Northwest. (The chest will not be there if the mummy has not taken two of your treasures.) The block cannot be moved, but is simply an obstacle.

James Pede

VORTEX FACTOR

Scoreboard:

In *Vortex Factor*, how do you get past Cairo Moon 2? What's behind the bookcase? How do you get through north doors?

Tom Rawlinson
Toronto, Ontario

Darkest Cairo

Scoreboard:

In *Vortex Factor*, when I go to Cairo, it says it is too dark to see. If I try to move it says I fall and hit my head, which ends the game.

Chris Sparks
Nicoma Park, OK

Scoreboard:

How do you open the door that seems impossible and get past the gate in the basement of the castle in *Vortex Factor*?

Steve Adler and Bobby Limoges
Montreal, Quebec

Scoreboard:

In *The Vortex Factor*, I have figured out you need to make a candle to move around on Cairo, but when I go into the dungeon to get the string the door slams shut and I can't get back out.

A hint for *Calixto Island*: Be sure to take the air pump with you when you go to the island.

John Riddle
Linthicum, MD

Scoreboard:

How do you open the bank in *Vortex Factor*?

Eric Tabor
Chicago, IL

CRYSTAL CASTLES

Scoreboard:

On the CoCo 1 or 2, if you die once then go into the door on the first screen on *Crystal Castles*, you will be transported to a high level and get 140,000 points. On the CoCo 3, doing the same (no need to die once) you will get 490,000 points and be transported to an even higher level.

In *Dallas Quest*, how do you get past the snake on the path?

Marc Reiter
Cincinnati, OH

Scoreboard:

On the first screen of *Crystal Castles*, go into the door and jump. You will warp to a high level. Every time you use up all your bears, start a new game and go into the door and jump. You will be on the level right before the one you died on.

Jared Brookes
Calgary, Alberta

DUNGEONS OF DAGGORATH

Scoreboard:

In *Dungeons of Daggorath*, on the first level, put everything on the ground (with the exception of the leather shield), wait for a spider to come up, and let it sit there (two or three hours works best.) When you come back, all the monsters should be backed up waiting in line for you (it is much easier to kill all of the monsters this way).

Billy Foster
Fayetteville, NC

Ring and Run!

Scoreboard:

To destroy the image of the wizard in *Dungeons of Daggorath*, you must set down one of almost everything (sword, flask, shield, etc.). When it comes, attack it with a ring and run all the way down the corridor.

On the second board of *Zaxxon*, put your ship so it shoots into the corner. Then put it at the third height on your altitude meter. This will get you 1000 point bonus every time.

In *Raaku-Tu*, after you've killed the serpent at the blood-stained altar, get the golden idol. It will give you five points.

Frank Morrison
Mercer Island, WA

Smiling Blobs?

Scoreboard:

How do you get past the smiling blobs in *Dungeons of Daggorath* besides entering `MOVE`? How do you kill the blobs?

Chris Ravenell
Queens, NY

Scoreboard:

In *Dungeons of Daggorath*, when you kill the Wizard image, can you get the scroll he lays?

Larry Lockwood
Pine Bluff, AR

BEDLAM

Scoreboard:

Here is a *Bedlam* hint: If a doctor ever gives you a shot, type `PLUGH` — then you will be better and better.

Danny Buchanan
Tucson, AZ

Scoreboard:

In *Bedlam*, I cannot open the cabinet or the red doors.

In *Pirate's Adventures*, the keys are under the nailed rug and the parrot kills the snakes.

Jason Jones
St. Pauls, NC

Scoreboard:

I need *specific* instructions on how to get the keys from the cabinet and the room with the nurse in it, in *Bedlam*.

Scott Nagle
Danbury, CT

DALLAS QUEST

Scoreboard:

In *Dallas Quest*, I have been on the plane and seen the monkey. I haven't been able to get out of the jungle.

Gregg Thompson
Chesterfield, VA

Scoreboard:

How do you get past the cannibals and into the cave in *Dallas Quest*?

Jason Mulig
Ragley, LA

On An Egg Hunt

Scoreboard:

I can't figure out a way to get past the spider because I can't find the eggs in *Dallas Quest*.

Also, in *Sands of Egypt*, I can't find the scepter everybody keeps talking about.

Chris O'Neal
Terre Haute, IN

Scoreboard:

The command that must be used at the cave entrance in *Dallas Quest* is the command used to make Roger the elephant cooperate at Dumbo's nest.

In *Sands of Egypt*, where is the container? Is the snake oil useful?

Rodrigo Maldonado
Whittier, CA

GOLD RUNNER GUIDANCE

Scoreboard:

A helpful tip for the game *Gold Runner*: When too many "men" are too close to you, put a hole in the bricks just before a ladder. The men will be forced to go up or down, which gives you a chance to run. Is there any way to start at a different level besides Level I in *Gold Runner*?

Tony Fortino
Tacoma, WA

Scoreboard:

Level 19 of *Gold Runner* has me stumped. How do you get the last gold bar and manage to escape the blue level in order to be free to reach the ladder at the top of the screen?

Barbara Williams
Fort Madison, IA

SIFTING THROUGH *THE SANDS OF EGYPT*

Scoreboard:

In *Sands of Egypt*, I have the scepter (needed to open the pool drain) but I don't know what to type for it to open.

Omri Goren
Reseda, CA

Scoreboard:

In *The Sands of Egypt*, I am in the inner chamber underground. I translated the hieroglyphics and returned the scepter before I went underground again. I can't find any treasure. Also, how do you get out of the boat and up through the hole in the roof?

In *Pyramid*, I get the coins but the mummy always takes them before I get to the maze. I can't get past the serpent.

Phil Derksen
Hendersonville, NC

Go to Restroom?

Scoreboard:

What do you do at the oasis, other than drink, in *Sands of Egypt*? What items am I supposed to have (especially at the start of the game before the cliff)?

Jeff Haase
Timmins, Ontario

Scoreboard:

When *Sands of Egypt* first starts out, go North until you get to the cliff. Go West twice, get shovel. Go North twice, kill the snake.

Curtis Schaaf
Moro, IL

Snake Oil, Anyone?

Scoreboard:

Some assorted tips: In *Sands of Egypt*, get the snake oil into the canteen and return to the pool.

In *Bedlam*, to get the keys you will need to use the window hook.

In *Pyramid 2000*, to get past the serpent, `THROW` the statue at it.

In *Raaku-Tu*, how do you get past the gargoyle?

Philip Manwarren
Harrington, ME

Scoreboard:

In *Sands of Egypt*, I can get to the treasure room and get the ladder; what next?

Also, in *Dragon Blade*, I cannot figure out how to open the stone door.

David Boyd
Kenosha, WI

Scoreboard:

In *Dragon Blade*, if you fall into the mine, do you need to get something? If so, how do you get it? How do you get out of the mine?

David Hunt
Gaithersburg, MD

PYRAMID PARTICULARS

Scoreboard:

In *Pyramid 2000* I need to know how to get to the vending machine. In *Sands of Egypt* I need to know how to drain the pool, where the oil is to free the scepter, and how to enter the pyramid.

John Wood
Maroa, IL

Scoreboard:

Here are a couple of *Pyramid* hints: When you get to the chamber that has steps leading up a dome, go South. You will enter a room with some gold. Get the gold and go North, then West to the Bottomless pit.

Danny Flores
Louisville, KY

Scoreboard:

In *Pyramid 2000*, I can't get past the serpent in the pharaoh's room. I get the gold, scepter, food, water, statue box and lamp.

A tip for *Bedlam*: To get the green key, stay at the end of the hallway. Type `GET GREEN KEY WITH HOOK`.

Frank Morrison
Mercer Island, WA

Scoreboard:

In response to various recent cries for help . . . *Pyramid*: With the mummy, there's nothing you can do, except retrieve the treasures from the maze.

Zork I: The Slide Room's wall isn't granite. The only granite walls in the game are in the Temple and Treasure room.

Sands of Egypt: `RIDE CAMEL` three times to get to the pyramid. (However, you cannot get inside.)

Stephen Berry
Lake Jackson, TX

POTPOURRI

Scoreboard:

In *Zork I* I can't unlock the grating in the forest or get rid of the granite wall in the slide room or the temple. Is there any way to open the wooden door in the living room of the house?

Joseph Branciforte
Cromwell, CT

You Get a Line, I'll Get a Pole

Scoreboard:

In *Blackbeard*, to fish you need the string and a branch you cut from the coconut tree.

In *Martian Crypt*, where do you get the red gem?

Serge Grenier
Boucherville, Canada

Roll Over in the Clover

Scoreboard:

Some tips for *Black Sanctum*: Give the old man the jug of wine. When in the organ room, type `PLAY BACH` if you have the parchment.

In *Shenanigans*, where do you find the Shamrock to get past the snake?

Bill Hoban
Green Bay, WI

Scoreboard:

I can't get past the robot in the second room in *Escape 2012*. In *Black Sanctum*, how do you `BUILD` the altar? I can find everything else except some wood and nails.

Jerry Honigman
Waggoner, IL

What's for Supper, Grandpa?

Scoreboard:

In *Gantelet*, on Screen 7, go to the upper-right and get a food. Go a little higher up and get a potion.

Scott Jamison
Billerica, MA

Scoreboard:

In *Syzygy*, I can get the spacemit (either of two), blanket (any of several), sword, string and fuzzy space creature. But then what?

In *Enrak*, can anyone tell me how to light the lantern?

In *Escape 2012*, how do you get past the guard just outside your cell?

I have a fragmentary program called *M&M Shee*. Does anyone know where the complete program can be obtained?

John Tiffany
Washington, D.C.

Scoreboard:

With *Trekboer*, I get to the planet Alton, but I cannot get past the force field or the grate.

Edward Swatek
Chicago, IL

Most Take American Express

Scoreboard:

In *Calixto Island*, we can get on the island and find the crown and pottery, but we don't know what to do next. If we go back to the natives a second time, they won't take anything and our boat is deflated.

Dean Muller and Joel De Young
Elkhorn, Manitoba

Scoreboard:

A few hints for *Robot Odessy 1*: You need the white robot for the maze at the end of the sewer. If you lose one robot anywhere and can't recover it, you might as well start all over; you need all of them later in the game.

In *Dallas Quest*, how do you get the monkey to stop chewing the tobacco so you can bribe him to take the mask off the so-called head hunter chief?

Andy Thornton
Kalamazoo, MI

Double Speed

Scoreboard:

On *Slay the Nerius* and *Microbes*, you can achieve double speed. Before typing in your name, press the `SHIFT` key and while holding it down, press the @ key and let go. It may work on other games where you input your name in the text screen. Worth a try . . . game play is twice as fast.

Minesh Patel
Benton, AR

Scoreboard:

In *Hall of the King*, I get the crowbar, but I can't bend the bars on the gate. It always says, "I am not strong enough, now . . . ."

Damon McGaughey
Ashland, KY

Caught in a Loop

Scoreboard:

I go into a continuous loop in *Wizard's Castle*: well-traveled road, to barn, to forest, to river — and then die from a cyclops or other enemy.

Alex Abraham
Atlanta, GA

Scoreboard:

In *Raaku-Tu*, after you have the first 25 points (which you don't need to go over any rugs to get) try pushing the altar around a little bit. If that doesn't help, try `GO DOWN`.

Brent Dingle
Norwalk, IA

Scoreboard:

Can anyone out there give aid with *Raaka-Tu* (I escape a lot only to die) or *Shamus*?

John Beck
Suitland, MD

To respond to other readers' inquiries and requests for assistance, reply to "Scoreboard Pointers," c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will immediately forward your letter to the original respondent and, just as importantly, we'll share your reply with all "Scoreboard" readers in an upcoming issue.

For greater convenience, "Scoreboard Pointers" and requests for assistance may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`. Be sure to include your complete name and address.

— Jody Doyle

Tricking BASIC Into Printing Special Characters

By Marty Goodman
Rainbow Contributing Editor

How can I get my CoCo to print a quotation mark to the screen under Microsoft BASIC?

Raymond Lueders
(MOONSHINE)
Hanover Park, IL

Because the quotation mark is used as a delimiter in the `PRINT` statement, you need to "trick" BASIC into seeing it. This is done using the `CHR$` statement to create a quotation mark, putting it inside of a string, and then printing that string. For example, if you want the computer to print the characters `This is a "quote" printed to screen`, try this:

```
10 Q$=CHR$(34)
20 A$="THIS IS A "
30 B$="QUOTE"
40 C$=" PRINTED TO SCREEN."
50 PRINT A$+Q$+B$+Q$+C$
```

Line 10 generates a quotation mark. Lines 20 to 40 create the text strings, and then Line 50 prints it all.

Note that the same technique can be used to generate all sorts of other characters for printing to screen or to printer.

Using a Sony RGB Monitor

How do you hook up the CoCo 3's RGB output to a Sony RGB monitor? The monitor has a 34-pin connector with inputs for R, G and B, and a single input for combined down-going sync. The CoCo 3 puts out separate and up-going sync signals.

Barbara Winnett
San Bruno, CA
Kenneth Conklin
Alpena, MI

You need to feed both the H and V sync into the inputs of a NOR gate (use a 74LS02 chip). You may install this chip either inside your CoCo 3 (and run it out through Pin 10 of the cable after disconnecting Pin 10 inside the CoCo from the PIA to which it normally goes), or install it inside the Sony monitor, and provide for separate and up-going sync inputs on two of the many unused pins on that 34-pin dual-row header male connector that many Sony brand monitors use for their RGB A input. Then make up your cable accordingly. Be sure to tie high any unused inputs on that 74LS02. Note that a 74S02, 74F02 or 74ALS02 will work fine too.

Some Sony monitors lack the 34-pin connector and instead use only an odd, rectangular, 8-pin video connector. If yours is like that, you may want to install the 74LS02 chip inside the CoCo 3. One good way to do so simply and quickly would be to piggyback it on top of IC 15 (the 74LS04 chip in the CoCo 3), where the H and V sync signals are readily available.

Please note that the advice I gave on this matter in a previous "CoCo Consultations" column was slightly flawed. I suggested using separate inverter gates and then combining the outputs. This will not work. You could have used a single inverter gate and combined the H and V sync inputs using diodes and a "wire OR" circuit, but what I have recommended this month is a superior solution.

The Atari Connection

How can I hook up my Atari SC1224 RGB color monitor to my CoCo 3?

Kerry Bankston
Evadale, TX

Martin H. Goodman, M.D., is a longtime electronics tinkerer and lives in San Pablo, California. Marty is a RAINBOW contributing editor and writes the "CoCo Consultations" column. He is also the database manager of RAINBOW's CoCo SIG on Delphi.

Atari uses an odd 13-pin DIN connector for its video input, arranged as follows:

1 2 3 4
5 6 7 8
9 10 11 12
13

(looking at the female connector on the back of the Atari SC1223). Connectors for it can be ordered from Alpha Products, P.O. Box 4306, Thousand Oaks, CA 91360, (818) 899-9304. On this connector, pins 6, 7 and 10 are red, green and blue respectively. Pins 8 and 13 are ground, and pins 9 and 12 are horizontal and vertical sync, respectively. Pin 5 may be audio. Ostensibly the RGB analog levels and polarity of the Atari are similar to that of the CoCo's output.

When I hooked up my CoCo 3 to the Atari by merely hooking up the corresponding R,G,B and the H and V sync and ground lines, I got a sharp image. Unfortunately, the image was shifted by about a quarter of the screen up and to the left. There was not enough latitude on the H and V position adjustments of the monitor to get the image properly centered. There were some other problems as well, involving failure to display properly the ALT-CTRL-RESET "Three Mugateers" picture, and some weird behavior with some programs.

There appear to be some subtle differences in timing and/or expected signal levels. It is possible that several hours spent with an oscilloscope looking at the signals from the Atari ST color video and comparing them to those of the CoCo 3 would yield the answer. Possibly some delay circuits on the sync and/or repositioning of the magnets on the SC1224 monitor's picture tube would solve all of the problems.

The chief engineer at one company which sells RGB analog monitors confided that he was having a devil of a time getting his company's monitors to work properly with the Atari ST's video output, further implying some (probably intentional) weirdness about the RGB protocol used by Atari. It appears that the CoCo 3 uses a more standard sort of RGB than does the Atari ST, though in the world of RGB, there really is very little that can be considered a standard.

ROM Call Locations

Can you tell me the different ROM call locations needed to convert programs that ran under Disk Extended BASIC 1.0 to run under Disk Extended BASIC 1.1?

Ralph Coleman

Although Disk Extended BASIC 1.1 is nearly identical to Version 1.0 in terms of the *code* for its routines, almost every *call* is in a different place. I can't provide you with a complete list of such differences — it would take me far too long. But you can get all the information you need from looking at *Disk Extended Basic Unravelled*, a complete disassembly of both versions. This is published by Spectral Associates, and can be purchased from Spectrum Projects. I have been told that Spectral Associates will likely have released a disassembly for the ROM and patched RAM images of the CoCo 3 by the time you read this.

Changing *RTTY* Transmit Rates

How can I change the shift of the RTTY *program to transmit at 850 for 60 wpm operation that we use on the Air Force MARS net?*

Earl Kleeberger
Springfield, OH

A complete copy of the assembly language source code for the *RTTY* program is posted in the Data Communications section of the Delphi RAINBOW CoCo SIG. You may alter it at your own risk, but I warn you this is an extremely delicate and sophisticated code, and only a master 6809 programmer will be able to modify it and make it work as desired; the *RTTY* program is full of very precise real-time loops. The timing is an integral part of the way the code was written and cannot be altered in any simple fashion. Sorry.

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CoCo 3 Questions

How can I make my CoCo 3 have a readable display with a monochrome monitor? How can I make my CoCo 3 work in 80-column mode with the RS-232 Pak? Where can I get a TI 6847T1 VDG chip? No Texas Instruments distributor has heard of it.

Dick Buescher
Madison, WI

Set the palette so that you have white (palette color 63) on black (palette color 0) for the text display. The text will then look fine on a monochrome monitor. In 32-column mode this involves setting `PALETTE 12,0:PALETTE 13,63 0`. In 40- or 80-column mode you must play with palettes 0 and 8 (`PALETTE 0,63:PALETTE 8,63`). This, of course, is for BASIC programs. Other programs hopefully will offer the option of choosing a white on black display.

The program in the ROM of the RS-232 Pak is worthless, so don't worry about it not working in 80-column mode of the CoCo 3. But, with a multipack, you can use any of many excellent programs for the CoCo 3 and RS-232 Pak that support 80 columns. Commercial products that support the RS-232 Pak and CoCo 3 in 80-column mode include *Color Connection* from Computerware and *Data Pak II Plus* from Cer Comp. *Data Pak II Plus* provides good support for VT100 terminal emulation.

The 6847T1 VDG is not made by Texas Instruments. Instead, it is made by Motorola. Or rather, it was made by Motorola. In Volume 8, No. 1 of Motorola's Semiconductor Data Update flyer, they announce that as of March 31, 1987, they are discontinuing the 6847T1 VDG chip. This is not suprising, for the CoCo 2 has been out of production for nearly a year, and there were few other applications for that ill-fated chip. No one is interested in a 32-column lowercase-capable video generator when far more flexible video display chips are available.

Don't waste your time with the 6847T1. If you need one as a replacement part for your old CoCo IIB computer, the chip is available from Tandy National Parts.

Bad Boots on the CoCo 3

I have DL LOGO *and am unable to get it to boot on the CoCo 3. Can you help?*

Kenny Pikulski
(PIKULSKI)
Monumet Beach, MA

I'm unable to get Trivia Fever *to boot on the CoCo 3. Can you help?*

David Rehm
Fort Myers, FL

The reason both *DL LOGO* and *Trivia Fever* won't boot on the CoCo 3 is that they both boot up under OS-9 Level I, Version 1.0 or Version 1.1, and those versions of OS-9's boot process violate rules for the CoCo 3 and cause a crash. Fortunately there is a simple way to get around this. Merely boot up under OS-9 Level I, Version 2.0, then put the *Trivia Fever* or the *DL LOGO* disk in your drive and press the reset button once. OS-9 will reboot, but will bypass the very earliest stage of the boot process, and it was this stage that caused the crash. Using this technique, you can also boot up OS-9 Level 1 Version 1.0 on the CoCo 3.

I have examined the boot code that lies on Track 34 and have determined that the problem is an attempt to write over memory at $FE00 and up, where the CoCo 3 puts its interrupts. Indeed, I have been able to make a very minor modification to the boot code there that allows OS-9 Level 1, Version 1.0 to boot properly on the CoCo 3. Look for an article on the needed patch to be published in RAINBOW in the next month or so. Such a patch would make it unnecessary for you to get OS-9 Level 1, Version 2.0 by merely properly patching the boot routine of Version 1.0, *DL LOGO*, *Trivia Fever* and other early OS-9 Tandy products that currently suffer from the same problem.

PAL Switcher

You spoke of a PAL switcher in your article on the CoCo 3 fix for the CoCo Multi-Pak. Will such a gizmo be available as a commercial product?

Paul K. Ward
(PKW)
Arlington, VA

Yes, I believe that Spectrum Projects will be carrying a PAL switcher for the Catalog No. 26-3024 Multi-Pak. This device is of interest to those who own one multipack but want to use it some of the time with their CoCo 2 and at other times with their CoCo 3. It allows you to have both the old and new PAL chips installed and to switch between them. It is expected to retail for $29.95, but may be sold for a bit more with a special varient upgrade PAL included that allows running the *CoCo Max* hardware and software on the Coco 3.

Not Truly Random

I use the RND *function, but every time I start up a program using it I get the exact same "random" number sequence. How can this be fixed?*

Genaro Hernandez
San Luis Potosi, Mexico

The RND function generates a pseudo random number sequence that actually repeats after many values, on the basis of an equation. To get it to start up at a different part of that sequence, all you need to do is to "seed" the RND function with the particular value of the timer. This is done using the statement:

```
10 X=RND(-TIMER)
```

If you include this statement at the start of your programs, they will start at totally different values of the random number sequence each time, for the start point will be set with the value of the timer, which in turn will be randomly selected depending on the exact instant at which you typed RUN command.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form which has complete instructions.

DOWNLOADS

Sounds Like A Bad Connection

By Dan Downard
Rainbow Contributing Editor

• *When I try to use my RS-232 printer port, the computer just seems to hang up. I've tested the printer on other CoCos, and it works fine. Also, I've found that pressing down on the PC board of my CoCo will initiate printing.*

Dan Grampsas
San Francisco, CA

It sounds as if you have a bad connection from the serial I/O connector to the circuit board, Dan. Pin 4 on the serial connector must be held high in order to output data when using the port for a printer. This is called a handshake signal and normally sent from the printer to your CoCo to indicate that the printer buffer is not full and, therefore, ready to accept data. In your case, since you have a bad connection, Pin 4 is not high and data is not being sent to the printer.

Repair will consist of removing the circuit board and re-soldering the connection. If you don't feel comfortable with doing this, take your computer to a Radio Shack Service Center. My experience has been that Radio Shack's service organization is good.

A PASCAL Bonanza

• *I was wondering if you knew of a company that made a* PASCAL *program similar to* Turbo PASCAL *that is CoCo 3 compatible. I think* DEFT PASCAL *might be, but I haven't seen it advertised for a long time and I don't know how to get in touch with them.*

Craig Fischer
Renton, WA

Craig, I am aware of at least two PASCAL packages for the CoCo other than those that you mentioned. First of all Radio Shack has a PASCAL package for OS-9 that was introduced by Microware. You must first have OS-9 Level I Version 2.0 or Level II to use this package on your CoCo 3.

The second PASCAL editor and compiler I am aware of also requires OS-9. It is called *Dynasoft* PASCAL, and is distributed by Frank Hogg Labs.

I am no PASCAL expert, but I have seen both packages and can only comment that the documentation for the Radio Shack version is better. As far as the features, you will have to investigate.

Running a BBS

• *I own a 64K CoCo 2 with JDOS and two drives (SSSD), a modem 1B and a Deluxe RS-232 Program Pak. My goal is to run my own BBS by modifying the modem as described in the November 1984 issue and writing my own BBS software. I would like to be able to use both the RS-232 and the drive for this. Although the ACIA is not mapped into the same place as the drive controller, (ACIA: $HFF68 - $HFF6B, drive controller: $HFF40 - $HFF43), is it still possible to have them both on the busses without any problems? Can it be done with a Y cable? Can it be done with a Multi-Pak? Would you recommend OS-9 for this application? How well does JDOS work with OS-9?*

Rob Wedlock
Casper, WY

There is no hardware incompatibility between the ACIA in the RS-232 Pak and your disk drive, Rob. The problem is the ROM in the RS-232 Pak. It's at the same address as your disk ROM.

You have two alternatives to solve this problem. First, use a Multi-Pak interface. This prevents the ROM conflict and allows both your disk drive and RS-232 Pak to be used simultaneously.

You can indeed use a Y cable if you disable the ROM in the RS-232 Pak. At the same time, I do not recommend Y cables due to the problems they create adding extra capacitance to an already unbuffered bus.

Regarding your concern of using JDOS with OS-9, after the initial booting process, OS-9 is a 64K RAM operating system and does not use JDOS. You must be careful though! There are address conflicts between J&M disk hardware and reserved memory in the CoCo 3. I see no advantage in using either RS-DOS or OS-9 for a bulletin board, other than the fact that with OS-9 you can have a multi-user BBS. I would recommend OS-9 Level II if you're considering OS-9.

Dan Downard is an electrical engineer and has been involved in electronics for 27 years through Ham radio (K4KWT). His interest in computers began about eight years ago and he has built several 68XX systems.

Graphics Memory

• *I own a 64K CoCo 2 with a cassette player. I have been working on a drawing program, but I ran into a snag. I'm having trouble saving the graphics screen. When I try* `CSAVEM NA$, 1536,3072,380` *it saves perfectly but when I reload the picture, only the top half of it is there. Why is this? What is the correct statement?*

Rick Normandeau
Wetaskiwin, Alberta

Rick, the solution to your problem requires an understanding of the memory map of your CoCo and of how memory is allocated based on the different graphics commands. Two commands have a lot to do with how your memory is organized, `PCLEAR` and `PMODE`.

`PCLEAR` reserves a number of graphics pages (up to eight) for use as graphics screens. Each page occupies 1.5K of memory. When your computer is turned on, Extended BASIC reserves four pages, or 6K, of memory for graphics. This is the equivalent of a `PCLEAR4` command. This memory starts immediately above your text screen memory, which happens to be at $400 to $5FF. Keep in mind that the '$' stands for hexadecimal notation. If you want to convert this to decimal, use the following BASIC direct statement: `?&H600`. You should get 1536 as an answer. That just happens to be the starting address you mentioned in your letter. If you add $600 (the start of your graphics screens) and $600 (1.5K of graphics memory on startup) you get $1E00. Therefore, your BASIC program will start at $1E00, if you haven't changed the graphics memory allocated by use of the `PCLEAR` command. Otherwise, your graphics memory always starts at $600 and ends depending on the graphics memory allocated by the `PCLEAR` command.

Even though you allocate memory space by the use of the `PCLEAR` command, the actual amount you use depends on the `PMODE` command. The following chart will help you understand.

Command	Resolution	Pages
`PMODE0,X`	128 by 96-2 Color	1
`PMODE1,X`	128 by 96-4 Color	2
`PMODE3,X`	128 by 192-2 Color	2
`PMODE4,X`	128 by 192-4 Color	4
`PMODE5,X`	256 by 192-2 Color	4

As you can see, `PMODE0` requires one page, or 1.5K, per screen. You can select the screen used by the `X`, or second argument, of the `PMODE` command. To further our understanding, upon start-up you have the choice of four `PMODE0` screens, since each requires one page. Keep in mind that 1K=$400, or 1024, and that 1 page=1.5K=$600, or 1532.

Hopefully, from this discussion you can figure out what the starting and ending addresses are for your graphics screens. In your case, Rick, it sounds as if you are not executing the proper `PMODE` command for the graphics you have saved or maybe only saving half of the graphics screen in the first place.

High Speed Disk I/O

• *I've read that you cannot save or load anything from or to your disk drive under the high speed poke. I wish someone would tell this to my Color Computer. I just got my disk drive this year, and I have Disk Extended BASIC 1.1. I found out by mistake that I can save programs to disk under the high speed poke* `65495,0`. *Will this hurt my system in any way?*

If I use a J/M Controller on my disk drive, will I be able to use all 40 tracks?

Mike Zweitel
Sturtevant, WI

Mike, storing data to your disks has little to do with the speed of your CoCo. All of the data transfer is handled by the Western Digital WD1793 chip inside the disk controller. Interrupts are used to transfer data between the disk controller and the microprocessor inside your CoCo. Maybe you are comparing disk I/O to tape I/O, where software timing is used.

Suspect Chips

• *I have a 64K computer with Disk Extended BASIC 1.1, and I have a keyboard problem with my gray CoCo. I originally had the old Chiclet-type keyboard, and neither the G nor the O key would function unless you pressed the keys very slowly, and that only worked about 10 percent of the time. The problem only existed when the high speed poke was present. But when I had the new CoCo 2 keyboard installed, it didn't even work in the normal speed. The only way I can make an O or G is to push the SHIFT at the same time I push O or G. But this presents a problem when using a program that uses upper- and lowercase. In some machine language programs, the O and the G work fine.*

Mike Roush
Ottawa, KS

Mike, from the sound of your problem, I would be more suspect of either the 6809E microprocessor or the 6821 PIA than the keyboard contacts. I guess the fact that it won't work at high speeds is the key. Try replacing these chips and see if that cures your problem.

Old Drives for the CoCo 2

• *I have a TRS-80 Model I disk drive, (Catalog No. 26-1164). It uses 5¼-inch disks, 40 tracks, single-sided. I want to redesign it for my CoCo 2 64K. What do I do to make the change?*

Richard West
West Jordan, UT

Richard, all that you need to use your old disk drive is a Color Computer Disk Interface (Catalog No.26-3022) and the cable connecting the controller to your drive. I assume that the drive is in a case and has a power supply. Along with the hardware you get Disk BASIC. For your information the interface cable between the controller and drive uses a 34-pin flat cable connector.

Learning Machine Language

• *I have a 64K Color Computer with a disk drive and modem. I would like to learn machine language. I am looking for a program that has a machine language monitor, assembler and disassembler, like* Disector *for the Commodore 64. Is there one available for the CoCo 2? Also, is there a good memory map available?*

Mike Keahl
Lakeland, FL

Mike, have you tried *EDTASM+* from Radio Shack? I still use it for all of my machine language programming. It has an editor, assembler and a monitor/debug program named ZBUG. There have been several patches in THE RAINBOW for converting the original ROM Pak to disk I/O, but Radio Shack has since introduced Disk *EDTASM+*.

We published a memory map in THE RAINBOW several years ago, but I would recommend the *BASIC Unravelled* series by Spectral Associates, available from Spectrum Projects.

Uncovering the DOS Command

• *I have three questions. The first deals with a command I accidentally found in the RS-DOS operating system called* `DOS`. *When you type the command, the drive comes on and the computer loads a bunch of garbage. It isn't documented in my owners' manual. I thought it might be a boot for OS-9, but I don't have a copy to try it on.*

My second question deals with putting the computer in the Extended BASIC only mode without disconnecting the drive controller. I read a review in the February 1986 issue on a DOS Switcher from Spectrum Projects which led me to believe it would be possible to put a switch on the disk ROM enable. Then, by switching it out and rebooting ECB, the disk ROM would be completely transparent to programs like my old cassette version Telewriter. *Do you know if this would be dangerous to the computer or if it would even work?*

Finally, I would like to know about Y cables versus multipacks. How do Y cables work? Must the cartridge be designed to be used with a Y cable or will all cartridges work? Again, would use of the Y cable make unplugging the drive controller unnecessary, especially for things like the speech synthesizer cartridge?

Larry Ullom
Wheeling, WV

The DOS command is indeed a boot program for OS-9 that was added to Disk BASIC in Version 1.1 and later. It has other custom uses depending on your imagination. All that it does is transfer data from Track 34 of the disk and execute the program in memory.

As far as your question on the ROM switcher, I would recommend it for what you are trying to accomplish. You can use it by omitting one on the ROMs.

I do not recommend Y cables due to possible hardware timing problems associated with extra bus capacitance. At the same time the only real problem is that not all hardware add-ons use unique addressing. A Multi-Pak will solve most of these problems and still offer reliable bus operation.

Your technical questions are welcomed. Please address them to: Downloads, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We reserve the right to publish only questions of general interest and to edit for space and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

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OS-9 LEVEL II

Understanding How OS-9 Manages Memory

By Peter Dibble

Let's start by reviewing some terms from last month's article. The 6809 uses logical addresses to access memory. These logical addresses are intercepted by the DAT (Dynamic Address Translation unit) which translates them into physical addresses. All the logical addresses that a process can use (there may be up to 64K valid logical addresses) make up its logical address space. The physical addresses they translate to make up its physical address space. On the CoCo 3, the DAT translates addresses in 8K segments called blocks.

OS-9 Level II uses memory management hardware to give each process up to 64K, to protect processes from one another, and to make memory fragmentation irrelevant.

The normal use of OS-9 Level II is to use much more than 64K of memory to run many processes at the same time (maybe as many as 57 on the CoCo 3), and to isolate them from each other. There is a small increase in the memory available to a process (up to almost 64K) because most of OS-9 is hidden, but programs bigger than 64K are not directly supported by OS-9.

Large programs are one of my main interests and a feature of this series. Maybe I convinced you last month that OS-9 needs to support them. Why doesn't it?

There are at least two good reasons for OS-9 Level II to ignore the possibility that a single program could use more than 64K. Microware was always strongly committed to keeping all versions of OS-9 as compatible as possible. The changes required to make it much easier to use extended memory from within a program would have driven Level II far from Level I.

It probably wasn't worth the effort to make it easy to use extended memory. Limited memory is seldom a serious problem, and there are pleasing ways to circumvent the limit.

Processes and Address Spaces

Under OS-9 Level I, a process gets a program module, a data area with the stack growing toward the bottom of it, at least three I/O path numbers and an occasional slice of CPU time. Under Level II a process gets all that plus an address space. That's the main advantage and the main fault of Level II.

OS-9 allocates two regions of memory to each process. One is for the program module and any other modules the process brings in; the other region is for data. Since each allocation is for at least 8K, a single process uses at least 16K. If you assume that OS-9 uses 48K for itself and uses the 16K minimum per process, you find that the CoCo has memory for 29 processes. I got 57 processes by assuming that they all share common code and so get by with only 8K of memory per process.

OS-9 manages the DAT so a program has to make a special effort to access memory in another program's address space. If you run a buggy program, it is difficult for it to corrupt another program's memory. This is a particularly big advantage if you have several users on your system. It is a particularly dreadful problem if your program wants to use data that OS-9 associates with another process.

Using data associated with another process sounds pretty arcane. Processes usually don't even know that they share the processor. Why should they care that they can't access one another's variables? If you follow good OS-9 programming practice the separation will be no problem. If you don't, the big pitfall is that the OS-9 operating system has its own address space. You can't get at OS-9's data structures.

Hardware and software interrupts

Peter Dibble has a bachelor's degree in chemistry and is currently a graduate student in computer science. He has worked as an applications programmer, systems programmer and as the user services assistant director for the University of Rochester Computing Center. With Dale Puckett, he is the coauthor of The Complete Rainbow Guide to OS-9.

are a problem for OS-9. The 6809 insists on using interrupt vectors in the top few bytes of memory. The processor doesn't know about the DAT, so those vectors have to be at the top of every logical address space. Does every program have to include the interrupt vectors and service routines?

The problem is solved with a bit of a kludge. There is a 256-byte piece of OS-9 in every address space. It catches interrupts, sets up a few things, switches the task register to select OS-9's address space, and jumps into the main part of OS-9.

Fragmentation

There is no such thing as memory fragmentation under Level II. OS-9 builds an address space by setting up a DAT image (a copy of the values it will store in the DAT registers for that address space). It plunks block numbers into the DAT image any way it likes. They don't need to be sequential or even in order. OS-9 Level I requires that allocations of memory be contiguous. Memory management lets Level II escape that requirement and the fragmentation problem with it.

Building an address space for a process proceeds in two steps. One step is to find the program module for the process. The memory containing the module is put at (or near) the high end of the DAT image. The other step is to find enough free blocks for the data space the program wants. These blocks are put at the bottom of the DAT image.

Here's an example in more detail. The object is to create an address space for the imaginary program *Tester*.

a) Put the blocks containing *Tester* near the top of the image. OS-9 searches for the *Tester* module, finds it in blocks 20 and 21 and puts them in the image:
(0, 0, 0, 0, 0, 0, 20, 21)

b) Find enough free blocks to satisfy *Tester*'s requirements (20K). OS-9 searches these for three blocks, and finds them at 30, 35 and 50:
(30, 35, 50, 0, 0, 0, 20, 21)

c) Fill the remaining slots in the DAT image with a junk block number. Some block number must be designated as junk for this purpose. If it's 62, the final DAT image will be:
(30, 35, 50, 62, 62, 62, 20, 21)

The top 512 bytes of each address space are reserved for OS-9 and the memory-mapped area. If a module would overlap that memory, OS-9 doesn't use the top block for it. The only way OS-9 can fail to find the memory for a program is if there are not enough free blocks anywhere in memory.

A Pitfall

When you load modules, OS-9 makes a special address space for them. This gets interesting when you load a file containing several modules which OS-9 neatly packs into an address space. This saves lots of memory, but when you use any one of the modules, OS-9 brings the entire module address space with it.

If you like to include utility programs in your `OS9Boot` file, *be warned*. You get everything in the bootstrap with any utility program. If you have 32K of modules in your bootstrap including `GoToXY`, you will have mysterious problems. A program that wants to use `GoToXY` will link to the module. OS-9 will map the address space containing `GoToXY` into the program's address space — *all* 32K of it. When the program runs out of memory you will be surprised. After all, `GoToXY` is only 200 bytes or so.

That's a mighty fast treatment of modules. I'll come back to them, but I wanted to make sure this little pitfall was exposed early.

OS-9 puts each process in a separate address space. This means that processes can't easily access one another's memory. The best assumption is that your program can only use data that it has allocated. It can't use OS-9's variables. It also means that one program's stray pointer won't crash another program.

Since the DAT can assemble an address space from blocks of physical memory in any order, memory fragmentation is not an issue for OS-9 Level II.

Merging modules into files is a good idea under Level II. It is commonly used for utility programs that you load from a file at start-up time. Collections of more than 8K of modules are not so good. Including modules that aren't part of OS-9 in `OS9Boot` is a bad idea.

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RAINBOWTECH

16K Disk

BITS AND BYTES OF BASIC

Making the Most of CoCo 3 Features — Without Overdoing It

By Richard A. White
Rainbow Contributing Editor

After last month's physics and programming lessons, it is time for lighter fare. A few trips to RAINBOW's Delphi CoCo SIG recently, has opened my eyes — and my pocket too — to things going on in the CoCo world that I had not kept up with. There are some really fine software packages for all CoCos just waiting to be downloaded. Most of the CoCo 1 and 2 items run on the CoCo 3 as well.

One of the finest programs under RS-DOS is *KDSK* by Kenneth L. Wuelzer, 113 Arrowhead Dr., Montgomery, AL 36117. Talk about a disk utility package, this one does it all and runs on all CoCos. It will format a target disk and back it up with a disk in another drive in 110 seconds. It takes RS-DOS nearly as long just to DSKINI a disk. We control our CoCo users group public domain library by copying disks for later sale at $2 or $3 at the meetings. You can imagine what a boon *KDSK* has been to the librarian.

By the way, our library includes only public domain and shareware software. Some of the material on the Delphi CoCo database is in it. Software published in RAINBOW is not in the library, in keeping with RAINBOW's policy. Nor is there commercial software in the library, even for people to "try out." *KDSK*, which is shareware, is in the library. Shareware should be copied and distributed, since the first objective is to get it into the machines of as many people as possible as quickly as possible. Cash return to the author correlates directly with the number of "free" copies distributed. Get a copy of *KDSK* and give one to each of your friends. Those who like and use the program are requested to send Kenneth Wuelzer $15 for a registered disk with complete documentation files. That is little enough to ask for software of this quality.

With *KDSK* you can format individual sectors or tracks. Every time it works on a disk, it backs up the granule allocation table and disk directory sectors 1 to 9 on Track 17 to the unused sectors 10 to 18 on the same track. Now if the demon strikes Sector 2 and wipes out your granule allocation table, there is a chance for recovery. Find out which sectors are wiped out (generally only one or two), and use *KDSK* to reinitialize only those sectors. Then have *KDSK* move the hidden directory back to sectors 0 to 9.

Want to copy only certain programs off RAINBOW ON DISK to your working disk? *KDSK* prints a lettered directory and asks you to type only the letters corresponding to the files you want copied. When you press ENTER it goes off and copies all indicated files — fast. Kill works the same way. Want to format a disk as double-sided, 40-track using RS-DOS, perhaps to use with JDOS or ADOS? *KDSK* can do it. In fact, it can make a double-sided 40 with MS-DOS format.

Another capability is to make a master file of all your disk files and print a sorted list complete with disk number and other data. And of course it has the basic utilities to work on individual disk sectors for dumps, changes and the like. My *KDSK* registration number is #00017 and the disk goes into my Hall of Fame alongside my Serial #121 *Telewriter* cassette. Next time you are on RAINBOW's Delphi CoCo SIG, download *KDSK* from the Database Utilities section.

There is a large amount of graphics material on Delphi. Much of it is stored in the *MAXCMP* format developed by Art Flexser and Mike Ward. A PMODE 4 picture is compressed and stored in DATA statements in a BASIC program that decodes the data and re-displays the graphic when run on your computer. The program has subroutines to save the graphic to disk as a standard binary dump. The software can handle double-screen *Graphicom* and *Colormax* pictures. Though generated on CoCo 1s

---

Richard White lives in Fairfield, Ohio, has a long background with microcomputers and specializes in BASIC programming. With Don Dollberg, he is the coauthor of the TIMS *database management program.*

and 2s, all pictures I have downloaded run fine on my CoCo 3.

There is a considerable number of digitized pictures and the software to print them using Epson or Epson-compatible printers. This did me little good, as I have Radio Shack printers. However, recent additions to the SIG include software to display converted digitized pictures using the CoCo 3 640-by-192 screen. For those into digitized pictures, this is a big step forward.

Even more spectacular are Apple Macintosh pictures that can be loaded and viewed on a CoCo. Macintosh pictures are 512 pixels wide and a number of times longer than 192 lines, so only a portion can be viewed at a time. On a CoCo 3 in the 640-by-192 mode, viewing is far more satisfactory. Files and software are in the Graphics portion of the Delphi CoCo SIG database.

Here is a hint that can save lots of money if you are new to the CoCo SIG. Open your terminal package buffer and read through program descriptions as fast as possible. When the buffer nears full, save it to a file on disk, clear the buffer and continue reading. If you are using *GETerm*, the buffer holds about 39,500 characters, so you can get a good quantity at a time. Still, it took me five full buffers to do most of the Graphics section.

Next, use a program like *Lister* (included here) to print the files on your printer. Now you can read the descriptions at your leisure without running up Delphi charges. To access a particular program, enter the Database section and type R and the first few characters of the description's name. Where the name is not unique, find one before the one you want that *is* unique and read back from there until you reach your target.

Here is another money-saver. If you plan to do explorations of what is on Delphi, buy a 1200 baud modem before you start. Since the charge is the same whether you use 300 or 1200 baud, you download much more material per buck at 1200 baud. You can easily save the price of the modem in the first month.

BASIC programs specifically for the CoCo 3 are starting to show up. Some are good and some are not. Some are reworks of CoCo 1 and 2 BASIC programs and try to use CoCo 3 features. Frankly, it only took me five minutes to get quite tired of a flashing menu line. The words are hard to read. It's one thing to have neat new features, but it is quite another to use them to maximum advantage.

And we have color troubles in CoCo City. A program written for TV or color composite video can be unusable with the CM-8 monitor. I worked a while with a disk indexing program that changed foreground and background colors for each new screen. The 80-column buff characters on a light blue background cannot be read. I can't believe the author saw this screen in these colors. I have not tested the program on a composite monitor, but I think the problem involves differences in ways composite video and the CM-8 display certain color numbers.

We never had these problems before. CoCo 1 and 2 colors were so few, I stuck with an amber monitor and did not bother with software that used colors that looked the same on the monitor. Artifact colors left me cold as well. I felt if something could not be done right, then let's not bother with it at all. Now with so many colors available and two

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different display systems and a natural tendency to use it all, we have problems.

First, authors must resist the tendency to get too cute in software they want others to use. Character-oriented software should be legible first. Then some careful dressing up can be tried. Stick with basic colors and assure good contrast in both composite and analog systems. I think it is definitely OK for the software to ask if CMP or RGB display is being used and set the palette accordingly. RGB, CMP or TV versions of a program may be an answer. In the case of TV, 80-column characters are not legible and the left two or three are chopped off by the TV.

So the author is left with the dilemma of whether to write the program for everyone, for one or the other monitor systems or for monitors as a group without TV compatibility.

Greg Miller went so far as to provide for nine different display choices with his *Greg-E-Term* terminal program. Three of these options are for the CoCo 3 while the rest support CoCo 1s and 2s. In the CoCo 3 mode, *GETerm* lets the user choose foreground, background and border colors. In addition, the user can configure many other parameters to tailor *GETerm* to a specific communications system. The configured program is then saved to disk and is all ready to go when next loaded.

In a lot of other ways, *GETerm* turns out to be one of the nicest terminal packages I have used. It supports a solid Xmodem protocol that works well with Delphi, even when Delphi takes an extended break to service other users. Fortunately, this happens infrequently, but when it does *GETerm* patiently waits till Delphi returns. Otherwise, the error rate has been extremely small working 1200 baud through CoCo 3's serial port. *GETerm* can be downloaded using Xmodem from the Communications section of the Delphi CoCo SIG database.

Whatever the display system choice, that choice should be stated and the software must be tested to assure that it works as advertised.

> *"Fragmentation within the CoCo System is hardly unique in the computer world."*

If you can get into trouble with color in character-oriented work, think of the can of worms the graphics world faces. The Tandy CoCo 3 demo is a case in point. Certain sequences just do not work on CMP and TV. Red grass doesn't cut it. Of course the demo exists to showcase the CoCo 3 *and* the CM-8 and it does the advertised quite well.

RAINBOW has categorized programs for years, using amount of memory, and whether disk or tape are used, as the parameters. The CoCo 3 requires at least a display parameter. I propose All, TV&CMP, CMP and RGB. Of course such descriptors should appear on information services such as Delphi, as well.

I am calling for categorization of CoCo 3 software, since I do not feel a multi-mode monitor stands a chance. Sure, they are out there and can be made to work, even as a TV to watch those wonderful artifacted colors in PMODE 4. And a small percentage of CoCo 3 owners will choose that route, although no one in my group of CoCo 3 owners has shown the slightest interest. And I am not about to spend the bucks or put up with the hassle. I don't think many others are, either — at least not right now.

Fragmentation within the CoCo System is hardly unique in the computer world. The MS-DOS community had a nice standardized system for a number of years. That is coming apart with multiple graphics systems and new machines that are incompatible with earlier ones. There's been an explosion of choices and it is hard to tell which are important to consider and which are inconsequential, much less deal with the important questions.

Well, we had a nice standardized machine and have fussed for something better for years. Now we have it and we need to do some work to make the most of our new options without overdoing to the point that things become cute. My worst fear is that color will be used for its own sake and functionality will be compromised. Things like that will turn off current and potential users *fast*. ☐

The listing: LISTER

```
1 'LISTER- A PROGRAM TO LIST AN
ASCII FILE TO SCREEN OR PRINTER
10 PRINT"LISTER IS SET UP NOW FO
R 9600    BAUD RATE TO THE PRINTE
R.  IF    YOUR PRINTER RUNS AT 60
0 BAUD,   DELETE THE POKE 150,1 I
N LINE    20. IF YOU PRINT AT SOM
E OTHER   BAUD, CHANGE THE POKE,
DELETE    LINE  10 AND RESAVE THE
 PROGRAM.
20 CLEAR 800:POKE150,1
30 LINEINPUT "FILE NAME? (PRESS
<ENTER> FOR DIRECTORY)";F$:IFF$=
"?"ORF$=""THENGOSUB120
40 PRINT"SCREEN OR PRINTER? (S/P
) ";:GOSUB110:DV$=B$:IFDV$="S"TH
ENDV=0ELSEDV=-2
50 CLS:IFDV=-2THENPRINT:PRINT:PR
INT"printing......"
60 OPEN "I",#1,F$
70 LINE INPUT #1, A$
80 PRINT#DV,A$
90 IF EOF(1)=-1 THEN PRINT"end o
f file";:CLOSE#1:END
100 GOTO 70
110 B$=INKEY$:IF B$="" THEN 110
ELSE RETURN
120 PRINT"DRIVE#? ";:GOSUB110:IF
VAL(B$)>3THEN120ELSEDIR VAL(B$):
GOTO30
```

KISSable OS-9

Rambo Takes Us Back to the Beginning

By Dale L. Puckett
Rainbow Contributing Editor

Back in October of 1983 we borrowed the title for this column from that famous acronym, KISS, short for Keep It Simple Stupid. Our intention was to write a column full of tips that would indeed make OS-9 simple to operate. Yet, on many occasions our enthusiasm for new and exciting tools got in the way and we did everything but keep it simple.

This month a letter from Michael H. Rambo inspired us to get back on track. Mr. Rambo wanted true lowercase characters on his Color Computer screen. He owned the 'B' version with the new 6847T1 VDG. With ADOS he was able to make it happen. By the time he had switched to OS-9 he was spoiled. He wanted to keep his lowercase characters.

With ADOS he switched modes by storing Hex 55 at $FF22. Not to be fooled, he jumped right in and wrote a Hexdump program in BASIC09. Then, he searched for and hand disassembled any code in the OS-9 memory modules that made reference to $FF22. Let me tell you, Michael has a lot more patience than I do. His hand disassembly looked accurate. He even got it to work — partially. By changing a byte at $3D5 in the CCIO module that comes with Version 2.00.00, he was able to get OS-9 to boot up from his modified ADOS with the lowercase and inverse video screen he wanted. However, every time he did a warm reboot by pressing the reset button he would lose his lowercase screen. He wrote us looking for a 100 percent reliable method of patching OS-9.

The secret is not to patch. OS-9 Version 2.00.00 gives you a utility named `tmode` which is tailor-made for the job. You use this tool to tell OS-9 what your hardware looks like. For example:

```
OS9: tmode upc -pause
```

This command line tells OS-9 you want the terminal on the standard output path to print only uppercase letters and you do not want it to stop and wait for you to give it a go-ahead at the end of a screen page. The following command will do just the opposite.

```
OS9: tmode -upc pause
```

After giving this command, OS-9 pauses and lets you catch up on your reading after it fills your screen. And, it prints lowercase letters on your screen as lowercase — true lowercase if you have one of the newer machines and use the trick we are about to show you.

The solution to Rambo's problem rests with `tmode`'s type parameter which is used to tell OS-9 how to initialize the ACIA chip in the Radio Shack RS-232 program pack and how to set up your Color Computer screen. This month, we'll stick to the screen.

The information that defines your screen is stored in bits 0 and 1 in the type byte. If Bit 0 is off, OS-9 will not know that your machine has true lowercase capability. If Bit 0 is on, OS-9 recognizes that your machine has a chip that can generate true lowercase characters and will govern itself accordingly.

Bit 1 of the type byte tells OS-9 the width of your screen. If Bit 1 is clear (or zero) OS-9 knows that your screen is 32 characters wide. That is the case when you are using the true lowercase capability of the VDG chip. If you are using one of the hardware program packs that generate an 80-column screen you will want to set Bit 1. Let's look at a couple of examples.

```
OS9: tmode type=0
```

After you type this line, the path descriptor on the standard output path will be set up for a 32-column screen that does not have true lowercase capability, i.e., an older VDG chip.

```
OS9: tmode type=1
```

This command tells OS-9 that your machine has the proper VDG to generate true lowercase characters.

```
OS9: tmode type=3
```

If you type this command, OS-9 thinks your screen can generate true lowercase characters and is 80 characters wide. This condition would be true if you were using a hardware program pack that outputs 80 columns. But, there's a gotcha! If you just type `tmode type=1` alone, OS-9 will not automatically switch you into the true lowercase mode. To make this happen you must issue two commands. Do it like this:

```
OS9: tmode type=1
OS9: display e
```

Or, like this:

```
OS9: tmode type=1 ; display e
```

The moral of our story — don't use a sledge hammer to kill a flea. Take the time to study the documentation. A small investment here can often save

---

Dale L. Puckett, who is author of The Official BASIC09 Tour Guide *and coauthor, with Peter Dibble, of* The Official Rainbow Guide to OS-9, *is a free-lance writer and programmer. He serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. Dale works as a U.S. Coast Guard lieutenant and lives on Governors Island in New York Harbor.*

you much time. I must confess I was unable to find the fact that I needed to type `display e` to make the switch anywhere in the documentation that came with the Version 2.00.00 upgrade. I found it by trial and error.

Turning off /D0

Last month we showed you how to set up a system disk for your hard disk based OS-9 computer that will operate without the floppy disk device descriptors and device driver, `ccdisk`. By removing these and other unused modules from your `OS9Boot` file you can really trim your system and make more memory available for your programs.

You can still boot up from a floppy startup disk because the boot module stored on Track 34 of your Radio Shack system disk contains the code you need to talk to the disk drive mounted in slot /d0. There is one small detail that you will want to take care of, however. For long-term operation in this mode, you need a way to turn off the floppy drive in the slot normally named /d0.

Since you have removed the /d0 floppy device descriptor module from your `OS9Boot` file and are using the name /d0 for your hard disk descriptor, you don't have a way to talk to the floppy disk drive to tell it to shut off. But, think again! Where there's a will, there's a way!

The quick and dirty way to turn off the motor on the floppy disk drive is to use the OS-9 `debug` utility. Try this:

```
OS9: debug
Interactive Debugger
DB: .SPACE BAR ff40 ENTER
  FF40 FF
DB: =00 ENTER
ERROR #010
  FF40 FF
DB: q ENTER
```

Shortly after you type `=00` you'll notice the red LED go out on your drive and hear the motor stop running. That's easy enough. In fact, you could even run `debug` from within your startup file using a script containing the `debug` commands we typed manually above. However, it wouldn't look very elegant — and most important, it would steal several seconds of your precious computing time from you every time you boot your system.

Wouldn't you rather have a short machine language program you could run automatically from your startup file? Let's go for it. Besides, it gives us a chance to give many of you an introductory look at the OS-9 assembler, `asm`.

Getting Started With Asm

When you start a programming project you enter a `do` loop. Regardless of the language, whether it is low-level like 6809 assembly or high-level like BASIC09, PASCAL and C, there are at least three steps you will find yourself repeat-

Listing 1: `driveoff`

```
 ifpl
 use /d0/defs/os9defs
 endc

 mod length,name,prgrm+objct,reent+1,start,datasize

 rmb 200  reserve for stack

datasize equ .
 name fcs /D0Off/
        fcb 1 Edition Number
        fcc /From KISSable OS-9, April 1987/

start clra
   sta $ff40
   clrb  Clear Error
   os9 f$exit  Return to Shell

  emod

length equ *
  end
```

Listing 2: `driveoff.listing`

```
00001                              ifpl
00003                              endc
00004
00005   0000 87CD003C              mod   length,name,prgrm+objct,reent+1,start,dat
00006
00007 D 0000                       rmb   200          reserve for stack
00008
00009 D 00C8          datasize equ   .
00010
00011   000D 44304F66  name       fcs   /D0Off/
00012   0012 01                    fcb   1           Edition Number
00013   0013 46726F6D              fcc   /From KISSable OS-9, April 1987/
00014
00015   0031 4F        start      clra
00016 W 0032 B7FF40                sta   $ff40
00017   0035 5F                    clrb             Clear Error
00018   0036 103F06                os9   f$exit     Return to Shell
00019
00020   0039 5F6D14                emod
00021
00022   003C           length     equ   *
00023                              end

00000 error(s)
00001 warning(s)
$003C 00060 program bytes generated
$00C8 00200 data bytes allocated
$18A3 06307 bytes used for symbols
```

ing many times. In a pseudo-language it might look like this:

```
While Your program doesn't run
      properly Do
      Enter or Edit the Source
      Code file
      Assemble or compile into
      object code
      Debug the object code using
      your system debugger
EndWhile
```

When the loop above gets to this point your program most likely runs properly and it is time for you to write the documentation so everyone can use it.

Most common OS-9 `asm` command lines look something like this:

```
OS9: asm #18K driveoff o
```

If you type this command, OS-9 will load in your assembler from your current execution directory — `/D0/CMDS`. It reserves 18,432 bytes or 18K of memory for the assembler to use for data storage. It assembles a file named `driveoff` which it assumes you have stored in your current data directory. When it is finished, it will have created a file in your current execution directory, `/D0/CMDS`. That file will contain an OS-9 module which you can load and run from the OS-9 prompt.

Why did you need to ask for more memory on the command line? That's a good question. Unfortunately, the OS-9 `asm` command only asks for 4,096 bytes of data memory when it comes alive. Because you usually need to assemble the `OS9Defs` file each time you assemble a program, 4,096 bytes isn't enough. You need at least 16K of memory for all but the shortest of programs.

Incidentally, you can permanently change the amount of memory `asm` requests by changing the 12th and 13th byte in the `asm` file with a utility like *Patch* from Computerware. For example, if you change the two Hex bytes, 10 and 00, which are stored there now to 3F FF, `asm` will automatically request 16K of memory when it starts up.

If you don't own *Patch*, you can accomplish the same thing with `debug`. First, load `asm` into memory. Then run `debug` and link to `asm` with the `l` command. Then change the two bytes and exit the debugger. When you see the OS-9 prompt again, save the `asm` module in memory into a temporary file and verify it to update the CRC.

```
OS9: save /d0/cmds/temp
asm                          ENTER
OS9: verify </d0/cmds/temp>
/d0/cmds/New.Asm u           ENTER
OS9: del /d0/cmds/asm        ENTER
OS9: rename /d0/cmds/new
.asm asm
```

But we said we would keep it simple this month! Let's get back on track by playing what-if. What if you don't want your executable file stored in your current execution directory. Rather, you want it in a special directory you have set up for your hard disk project. Let's call that directory `HDPROJECT`.

Notice how we always type the name of our directories with all capital letters when we create them. This lets us tell the difference between a standard file and a directory file with a quick glance at the screen. Also, let's assume that you want a hard copy listing of your assembled source code to help you spot any logic errors. Do it this way.

```
OS9: asm #18K driveoff L o=/d0
/hdproject/d0off>/p
```

The next time you run `asm`, you change your mind. You want to save the listing of your assembled source code in a file. You'll find time to look at it later, maybe. Besides, you don't need an object code file this time. You didn't really want to run the program, you just wanted to study the technique.

```
OS9: asm #18K driveoff L>
driveoff.listing
```

Notice that we typed an uppercase `L`

Listing 3: `IOMan.patch`

```
*  Either do the following manually, or use it as a shell procedure file
*  to make your new IOMan:

* Save the old ioman, and change it's name in memory:

save /d0/ioman.old ioman
debug
L ioman
. .+D
=41
* Load an ioman so we have extra space to play with:

$load /d0/ioman.old
L ioman
. .+3
=1D
L ioman
. .+8
=E2

* Fix known ioman bug:

L ioman
. .+6BB
=12
=E1
```

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so you couldn't confuse it with the number 1. Feel free to type a lowercase 'l' on your own command line if you would like. Remember these points and you should get along with the OS-9 `asm` command. Always ask for at least 16K of memory when you run the assembler unless you are not assembling the `OS-9Defs` file with your program. Always put the `o` for object code parameter on your command line if you want a file you can run later. And finally, always put the `l` for listing on the command line if you want `asm` to generate a listing you can study.

Looking Inside

Now that you know how to call `asm` from the OS-9 command line, let's look inside a short sample program. Since we still need a program to turn off drive /d0 in a system without a device descriptor by that name we'll tackle that problem.

Listing 1, `driveoff`, is a simple OS-9 assembly language program. In fact, this program only does one thing. It writes a zero to the location $FF40 in your Color Computer. This is the address of the multipack interface where you plug in your disk controller.

We picked this very short program so you would have a model or "shell" you can use to build your own programs. You will need all of the parts we have included in our listing in every OS-9 assembly language program you write. Since our program was designed to give you a model we have used generic names that you can use in any program. Listing 2 is how our program looked after we ran it through `asm`.

The first column of numbers you see in the assembled listing are merely line numbers. These line numbers are used in error messages and can help you spot a syntactical problem in your code. The next column shows the offset of the code generated by each line in your program within the actual module generated by the assembler. For example, if you use the `dump` utility to dump the object code file you generated, you would find the `d` in `d0off` represented as 44 Hex, exactly 13 — or D in Hex — bytes from the start of your file. If you loaded the file `driveoff` and used `debug` to examine the module `d0off` in memory you would also find the D at the same offset.

The next column of Hex code displayed in the assembled listing shows the actual 6809 object code, in Hex, that `asm` generated for you. Moving to the right, you'll experience deja vu. This column contains the labels you typed in the very first column of your original source code. Next, you see a column containing the operators or pseudo-operators you typed followed by a column containing the operands you entered. `Asm` has put your comments in another neat column.

We'll switch our orientation now from columns to rows. Notice the difference between the first three rows of our source code listing and the first two lines of the assembled listing. The assembler has left out the line `use /d0/defs/os9defs`. It did this because the first line in the file `OS9Defs` contains `opt -l` which turns off the listing. It isn't turned on again until after the entire `OS9Defs` file is assembled. For this reason you may want to insert a comment line in your own source code to remind yourself what you wrote there.

The conditional statement `ifp1` or "if pass one" lets the assembler read the `OS9Defs` file on its first pass but causes it to skip it on the second pass. Once the assembler has recorded the information in the `OS9Defs` file in its symbol table, it doesn't need to see it again. Note here that if you are using `asm` you must always have the `DEFS` directory available on drive /d0. And, the file `OS9Defs` must be stored in that directory.

The next line of our program is the one that creates the standard OS-9 module header. You will see this same line, or something very similar, in almost every OS-9 assembly language program.

If you use the OS-9 `dump` utility to look at the object code in `d0off` after

```
* Insert lbra to patch:

L ioman
. .+4BE
=17
=02
=4F

* Now add the patch:

L ioman
. .+710
=3D
=B7
=FF
=D8
=AD
=8B
=B7
=FF
=D9
=39

* Plus new crc:

=70
=DF
=FF
save /d0/ioman.tmp ioman
*  Now ident ioman to see if it is a good module.
*  If so skip the verify step and os9gen a new bootfile.

  verify u </d0/ioman.tmp >/d0/ioman.new
  del /d0/ioman.tmp
  attr ioman.new e pe

 *  Now os9gen a new boot file using ioman.new in place of the original.
 *  Reboot and try some disk I/O fuctions. If every thing is working fine then
 *  you are running at 2 MHz except for direct driver calls. IRQ driver code
 *  stays at 2MHz in this version.

~

~
```

you assemble it, you will quickly see what the `mod` statement does for you.

The first two bytes in your object code file will be 87 CD Hex. In fact, you will find that they are the first two bytes of every OS-9 memory module. The `mod` operator puts them in each module for you.

The next two bytes are 003C. Now look at the offset in the second column of your assembled listing. That's interesting! The offset at the label named `length` is 003C also. Now look at `name`. The listing says it is at an offset of 000D. What value do you see in the listing you "dumped" on your screen? I'll bet it's 000D. The same pattern should hold true for the labels named `start` and `datasize`.

`Asm` finds the value of `prgrm`, `objct` and `reent` in the `OS9Defs` file you called in with the `use` statement in the second line of your source code. If you look at the dump of `d0off`, you will see that `prgrm+objct` is 11 Hex and `reent+1` is 81 Hex. This means that `prgrm` has a value of 10 Hex and `objct` has a value of 01 Hex. Likewise, `reent` must have a value of 80 hex. List out the `OS9Defs` file and see if this is true. You see, there really is a very logical design behind OS-9. That's why it's so effective.

Notice that on every OS-9 assembly language program you write you will need to reserve at least 200 bytes of memory for use by the stack. This is in addition to the memory you need for your own program. The program `driveoff` did not require any data memory. While you're looking at that part of the listing however, note that the assembler has printed a `D` adjacent to the part of the listing that applies to data storage.

The `W` flag you see in that same column was put there to warn you that you directly addressed a fixed point in memory in that line of the code. This practice is taboo in OS-9 programming. However, we got away with it here because we are writing to a fixed hardware memory location that never changes.

The `fcs` operator generates a string of characters in memory. The last byte of that string has its eighth bit set. It is standard practice to put the edition number immediately following the name. The character string generated by the `fcc` operator doesn't do anything other than identify the source of the program in the object code file.

Listing 4: `terminal.asm`

```
 nam Terminal
 ttl Dumb terminal program

 ifp1
 use /h0/defs/defsfile
 endc

 mod Size,Name,Prgrm+Objct,Reent+1,Start,MemSize

****************************************
*
* A very fast dumb terminal capable of
* running 2400 baud rather effeciently
* under OS-9 vr. 02.00.00 on AciaPak.
* Some trickery was needed in order to
* acheive this high speed, such as
* having AciaPak send a signal on every
* character sent, reading and writing
* an entire buffer at once, and the
* super high speed poke. This may not
* work on all CoCo's but it works great
* on my F board, mainly because we are
* constantly accessing memory which
* keeps it refreshed. If any sleep were
* performed the contents of memory
* would be lost. Designed mainly for the
* newer CoCo 3 which is highly capable
* of running in the high speed mode but
* may also work on others but there is
* no guarantee made. Use control Z to
* exit. The command line should look
* like 'Terminal /T2'...
*

Name fcs /Terminal/
 fcb 1

CommPath rmb 1 Path number for the modem
ParamPtr rmb 2 Parameter pointer
Buffer rmb 256 Temporary buffer
CommOpt rmb 32 Modem options
CommSave rmb 32 Saved copy
TermOpt rmb 32 Terminal options
TermSave rmb 32 Saved copy
Stack rmb 10*1024 A HUGE stack just in case
MemSize equ .

Trap bsr ChekComm Check modem for data
 rti
```

```
Start sta $ffd9 Set super high speed
 stx ParamPtr Store parameter pointer
 lda #%00000011 * ------wr
 os9 I$Open
 lbcs ErrExit
 sta CommPath Store path for /t2
 leax Trap,pcr Get address of intercept routine
 os9 F$Icppt Set it in OS9's tables
 lda CommPath
 ldb #SS.Opt
 leax CommOpt,u
 os9 I$GetStt
 leax CommSave,u
 os9 I$GetStt
 lda #1
 leax TermOpt,u
 os9 I$GetStt
 leax TermSave,u
 os9 I$GetStt
 lbsr Setup
 lda CommPath

****************************************
*
* Tell AciaPak to send us a signal to
* let us know when data is ready for
* us to pick up with the Read call.
*
 ldb #SS.SSig
 ldx #$0010
 os9 I$SetStt

****************************************
*
* Main loop: Poll the keyboard and
* the modem. We do this in spite of the
* intercept routine also polling the
* modem to obtain our quick speed and
* there appears to be occassions when
* AciaPak does not send the signal. We
* use this routine to again tell AciaPak
* that we need the signal, keeping
* everything in sync.
*
Loop bsr ChekTerm
 bsr ChekComm
 bra Loop

****************************************
*
* Poll the keyboard and write any data found
* to the modem.
*
```

When you run the program `d0off`, OS-9 executes the code beginning at the label `start`. The `emod` operator tells `asm` that it has reached the end of an OS-9 module. The next line of code generates the length of the module for use by the `mod` operator above.

Let OS-9 Do It for You

The beauty of programming in assembly language using a powerful operating system like OS-9 comes from the fact that the operating system itself gives you a rich assortment of system calls that do all the nasty little programming jobs for you. All you have to do is set up the registers and use the OS-9 pseudo-operator to tell `asm` to let the system do it.

For example, we could use the following sequence of code to print the `KISSable OS-9` string in our program. First, we would need to put a label in front of the string, like this:

```
string fcc /From KISSable OS-9,
April 1987/
```

Then, we could generate the following code.

```
ldy #30
lda #1
os9 I$write
bcs error
```

We have loaded the 6809's Y register with the length of our string, loaded the A register with the number of OS-9's standard output path and called the `I$write` I/O system call.

Don't Mix Systems

A letter from Bill Burchell of Mission, British Columbia, encouraged me to remind you of a warning we had published earlier in the year. Do not mix different versions of your OS-9 system disk and the utilities that come with them. You can wind up causing strange problems that will leave you scratching your head until you're bald.

Burchell suggested that you can run OS-9 Version 1.00.00 on the CoCo 3 by booting first with *Deskmate*, exiting to the OS-9 shell and then changing disks. You can hobble along doing this if your local Radio Shack doesn't have the Version 2.00.00 upgrade in stock, but I wouldn't run that way too long. There are hundreds of subtle changes under the surface waiting to jump out at you in the form of weird errors that you'll

```
ChekTerm clra
 ldb #SS.Ready
 os9 I$GetStt
 bcs TermRts
 ldy #1
 leax Buffer,u
 os9 I$Read
 lda Buffer
 cmpa #$1a
 lbeq Exit
 bsr WritComm
TermRts rts

****************************************
*
* The first thing we do is to tell Acia
* not to send the signal to keep ourself
* from wrapping in here from the Intercept
* routine to pick up the same data and
* preventing the havoc from wreaking.
* Next, we check to see how many characters
* are waiting in the buffer. We then read
* the entire buffer in one fell swoop,
* put the whole mess out to the terminal
* (/term) and then tell Acia to turn on
* the signalling once more.
*
ChekComm lda CommPath
 ldb #SS.Relea Turn off signalling
 os9 I$SetStt
 lda CommPath
 ldb #SS.Ready How many characters waiting?
 os9 I$GetStt
 bcs CommRts None, so return
 clra Clear out the high bit
 tfr d,y Put waiting buffer length in Y
 lda CommPath
 leax Buffer,u
 os9 I$Read Read the ENTIRE buffer
 bsr WritTerm Go write the whole mess
 lda CommPath
 ldb #SS.SSig Turn signalling back on
 ldx #$0010
 os9 I$SetStt
CommRts rts Return to whence we came

WritTerm lda #1 Stdout
 leax Buffer,u
 os9 I$Write
 rts

WritComm lda CommPath
 ldy #1
 leax Buffer,u
 os9 I$Write
 rts

Setup leax CommOpt,u
 clr 4,x
 clr 5,x
 clr 6,x
 clr 11,x
 clr 12,x
 clr 13,x
 clr 14,x
 clr 15,x
 clr 16,x
 clr 17,x
 clr 18,x
 lda CommPath
 ldb #SS.Opt
 os9 I$SetStt
 leax TermOpt,u
 clr 4,x
 clr 5,x
 clr 6,x
 clr 11,x
 clr 12,x
 clr 13,x
 clr 14,x
 clr 15,x
 clr 16,x
 clr 17,x
 clr 18,x
 lda #1
 ldb #SS.Opt
 os9 I$SetStt
 rts

Exit clrb Clear error
ErrExit pshs b,cc Save error status
 leax CommSave,u Restore modem options
 lda CommPath
 ldb #SS.Opt
 os9 I$SetStt
 leax TermSave,u Restore /term options
 clra
 ldb #SS.Opt
 os9 I$SetStt
 sta $ffd8 Back to normal speed
 puls b,cc Restore error status
 os9 F$Exit Back to OS-9

 emod
Size equ *
 end
```

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HOT News for CoCo Users

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Listing 5: `mdir.c`

```
/* prints an extended module directory in plain english */
/* copyright (c) 1986 by Gregory A. Law */
#include <stdio.h>
#include <ctype.h>
#include <time.h>

main()
{
     unsigned *mod_ptr = 0x0026;          /* pointer to module directory       */
     unsigned *mod_end = 0x0028;          /* pointer to last module entry      */

     struct {                             /* module directory pointer          */
          unsigned mod_addr;              /* module address                    */
          char link;                      /* module link count                 */
          char dummy;                     /* this byte apparantly unused       */
     } *mod_dir = *mod_ptr;

     struct sgtbuf time;

     getime(&time);                       /* Get the system date and time      */
     printf("                Module directory at %02d:%02d:%02d\n\n",
          time.t_hour, time.t_minute,time.t_second);
     printf("Addr Size Owner      Type          Language    Revs Ed # Link Module na
     printf("==== ==== ===== ============== =========== ==== ==== ==== =========

     while(mod_dir.mod_addr < *mod_end) {           /* Range for module dir  */
          if(mod_dir->mod_addr != 0) {              /* Is module stil there? */
               printf("%4X ", mod_dir->mod_addr); /* module address          */
               get_info(mod_dir->mod_addr, mod_dir->mod_addr,
                    mod_dir->link, mod_dir->dummy);
          }
          mod_dir++;                      /* Increment pointer to structure  */
     }
}

/* This routine does the blunt of the work. It uses the pointers created   */
/* the main routine to pull out the information in the module header. It   */
/* then calculates the physical address of the module name and passes it   */
/* to another routine for fetching.                                        */

get_info(module, address, link, ed_num)
unsigned  *module;                        /* Pointer to the module header    */
unsigned  address;                        /* Address of the module header    */
char      link;                           /* Value of the link count         */
char      ed_num;                         /* Value of the unused byte        */
{
     unsigned  attr, revs;
     unsigned  type, lang;
     int       dummy;
     unsigned  offset;

     dummy = *module++;
     printf("%4X %5d ", *module++, ed_num);  /* mod size & owner             */

     offset = *module++;                  /* Get the offset to the name      */
     type = *module & 0xf000;             /* Get the module type code        */
     lang = *module & 0x0f00;             /* Get the language code           */
     attr = *module & 0x00f0;             /* Get the attributes byte         */
     attr /= 0x10;                        /* Make the attributes $00 - $0F   */
     revs = *module & 0x000f;             /* Now get the revision count      */

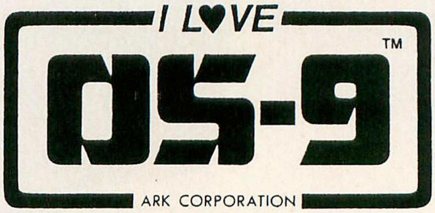
switch(type) {                       /* Figure out the module type     */
     case 0x1000:   printf("%-14s ", "Program");
                    break;
     case 0x2000:   printf("%-14s ", "Subroutine");
                    break;
     case 0x3000:   printf("%-14s ", "Multi-module");
                    break;
     case 0x4000:   printf("%-14s ", "Data module");
                    break;
     case 0xc000:   printf("%-14s ", "System module");
                    break;
     case 0xd000:   printf("%-14s ", "File manager");
                    break;
     case 0xe000:   printf("%-14s ", "Device driver");
                    break;
     case 0xf000:   printf("%-14s ", "Descriptor");
                    break;
     default:       printf("%-14s ", "User defined", type);
}

switch(lang) {                       /* Figure out what language       */
     case 0x0000:   printf("%-11s ", "Data");
                    break;
     case 0x0100:   printf("%-11s ", "6809 Object");
                    break;
     case 0x0200:   printf("%-11s ", "Basic09");
                    break;
     case 0x0300:   printf("%-11s ", "Pascal");
                    break;
     case 0x0400:   printf("%-11s ", "C I-code");
                    break;
```

seldom be able to duplicate and never be able to explain in great enough detail to get help.

Everyone Loves OS-9

ARK, Inc., 6-2, Hyakunincho 2-Chome, Silver Plaza Okubo DAI2 #303, Shinjuku-Ku, Tokyo 160 Japan, sent me a Christmas card again this year. The address is new, as is the slick stick-on label they sent us.



Ark, Inc., has another sticker that says "I Love OS-9 68000 ®." Maybe we'll see that one on a CoCo someday!

Rich Perry at Speech Systems, 38 West 255 Deerpath Road, Batavia, IL 60501, phone 312-879-6880, must be thinking about OS-9 now. We received an advertising flyer from him last week that featured a Turbo Hard Disk for the serious OS-9 user. A half-height 10-megabyte unit is $599.95. You can have 20 megabytes for $699.95. The flyer said to order OS-9 Level I or II for your CoCo 1, 2 or 3. Perry also featured a Turbo RAM for the CoCo 3. "Ideal for OS-9 Level II," it reads. Good things are on the horizon.

April Listings

We have a gold mine for you this month. Listings in Assembly Language, BASIC09 and C plus a special CoCo 3 procedure file take the spotlight. They come from Steve Croom, Dennis Duke and Greg Law.

Here's a patch from Steve Croom that will let you modify the `IOMan` module in OS-9 Level I, Version 2.00.00 for use on the CoCo 3. When you use it, your Color Computer and multipack interface will run smoothly at 2 MHz. When one of your programs makes an I/O call, this patch will cause OS-9 to slow down your system clock to .89 MHz. As soon as the call is completed, it will switch back to 1.8 MHz.

`Terminal` is a dumb terminal that can run up to 2400 baud effectively. It is designed mainly for the CoCo 3 and will work only with Version 2.00.00 and the AciaPak. The ACIA driver must support the SS.SSig Set Status Call. It works great with an 80-column card but may cause some garbage to be printed on your screen if you run it with `CO32` on a CoCo 1 or 2.

We also have `mdir`, a utility you can read in English. And, its output is pleasing to the eye. Tip your hat to Greg Law for this `C` listing.

How many times have you downloaded a file with the *Deskmate*, or other terminal program, only to wind up with an extra line feed at the beginning of every line. Worry no more! `Strip.c` will remove them for you. You can edit them out by hand with your editor, but it's a whole lot easier this way.

OS-9 Users Group President Resigns

We have learned that OS-9 Users Group President Brian Lantz has resigned for personal reasons. Lantz is a youth minister at his church and has been putting in upwards of 60 hours a week there each week. It is easy to understand why he couldn't keep up with a tough schedule like that and manage a national users group too.

Because of the long hours and hard work performed by the likes of Brian Capouch, George Dorner, Dave Kaleita, Carl Kreider, Bruce Warner, Joe Debuc and Steve Odneall — to name just a few — as well as a strong personal involvement with the growth of the group during my two years as president, I am sorry to report that many mail and other problems have created havoc for the OS-9 Users Group during the past seven or eight months. Vice President Bill Turner is digging in. He has a plan. The board of directors has been called to help for the first time in a year. Progress has been made on several fronts. Hopefully, recovery will be forthcoming soon. I have been investigating the problems for several weeks and have offered my help and several suggestions to Turner. I am studying his plan and will have further details next month.

Next Month

We've accumulated a number of excellent tips from several sources for next month's column. Frank Malaney, the author of *PrintForm*, has offered some tips to help you use his shareware program we published in 1986 and we hope to have some Level II information for you by then. We'll cross our fingers again. In the meantime we have a few more utility programs from our readers to share with you. Keep 'em coming! Until May, enjoy. ☐

```
        case 0x0500:   printf("%-11s ", "Cobol");
                       break;
        case 0x0600:   printf("%-11s ", "Fortran");
                       break;
        default:       printf("%-11s ", "Reserved", lang);
    }
/*   printf("%4d %4d %4X ", revs, attr, link); */

     address += offset;                  /* Use the module address and      */
     get_name(revs, attr, link, address); /* calculate the physical address  */
}

get_name(revs, attr, link, name_ptr)
char revs, attr, link;
char *name_ptr;
{
     char name[30];
     int  i = 0;
     char c;

     do {
          name[i++] = c = *name_ptr++;   /* Copy the char into storage      */
     } while (isprint(c));               /* Repeat until > $7F (high bit)   */
     attr = *name_ptr;                   /* Get edition byte                */
     name[--i] = name[i] & 0x7f;         /* Strip off the high bit          */
     name[++i] = '\0';                   /* Append NULL to the end          */
     printf("%4d %4d %4d ", revs, attr, link);
     printf("%s\n", name);
}
```

Listing 6: `strip.c`

```
char modid[] = "@(#)strip.c         1.2";

/*    --------- OS-9 utility ---------- strip ---------
 *
 *             by Dennis J. Duke
 *                Bessemer, Al.
 *                04 November 86
 *
 *        Strip off unnecessary leading characters (new lines) created by the
 *        Desk-Mate terminal program when downloading a file.
 */

# include        <stdio.h>

FILE    *fopen(), *fpin, *fpout;

main (argc, argv)
int      argc;
char     *argv[];
{
     int    c;

     /* Check to make sure the utility was called properly */

     if (argc != 3) {
         fprintf (stderr, "usage: %s infile outfile\n", argv[0]);
         exit(0);
     }

     /* Make sure the input file exists */

     if ((fpin = fopen (argv[1], "r")) == NULL) {
         fprintf (stderr, "%s: can't open input %s\n", argv[0], argv[1]);
         exit(0);
     }

     /* Make sure the output file can be created */

     if ((fpout = fopen (argv[2], "w")) == NULL) {
         fprintf (stderr, "%s: can't open output %s\n", argv[0], argv[2]);
         exit(0);
     }

     /* Read the input file */
     while ((c = getc(fpin)) != EOF) {

          /* If the character is a "new line", skip it */
          if (c == 10)
              continue;

          /* Otherwise, output it */
          putc (c, fpout);
     }

     /* Close the input and output files */

     fclose (fpin);
     fclose (fpout);
 }
```

THESE FINE STORES CARRY THE RAINBOW

The retail stores listed below carry THE RAINBOW on a regular basis and may have other products of interest to Tandy Color Computer users. We suggest you patronize those in your area.

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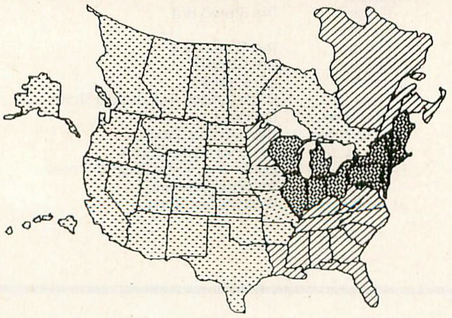

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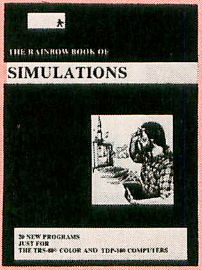

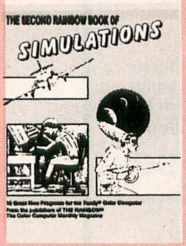

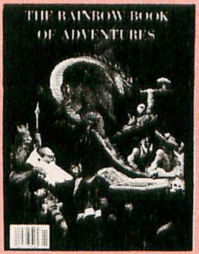

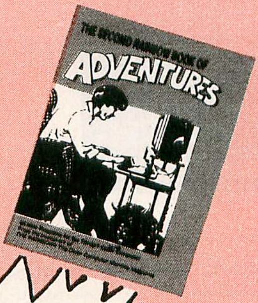

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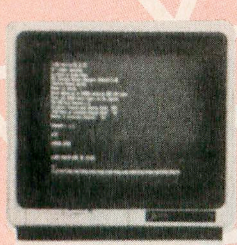

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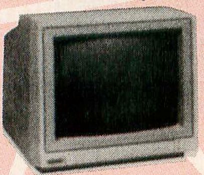

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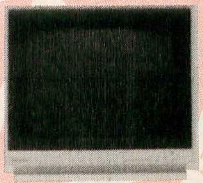

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1983
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FREEDOM

". . . Freedom is nothing else but a chance to be better . . ."

— Albert Camus

*** Mental Freedom ***

for CoCo 1, 2 and 3!

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We call it The Preble Thoughtware.

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for The Color Computer 3
(with versions for CoCo 1 & 2)

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MERGE LINES within a program with just a few keystrokes!

AUTO KEY REPEAT — Hold down any key and it will repeat.

INVISIBLE — Once EDITOR 3 has been loaded in, it is activated with a single keystroke! It hides itself out of the way of other programs and can be turned off any any time. Pressing RESET will not hurt EDITOR 3!

EASY TO USE — Installation takes seconds! Well-written goof-proof manual included.

COCO 1 & 2 — Yes, even though this program was conceived for the powers of the new CoCo 3, we still support the previous Color Computers. They too, need their BASIC Freedom!

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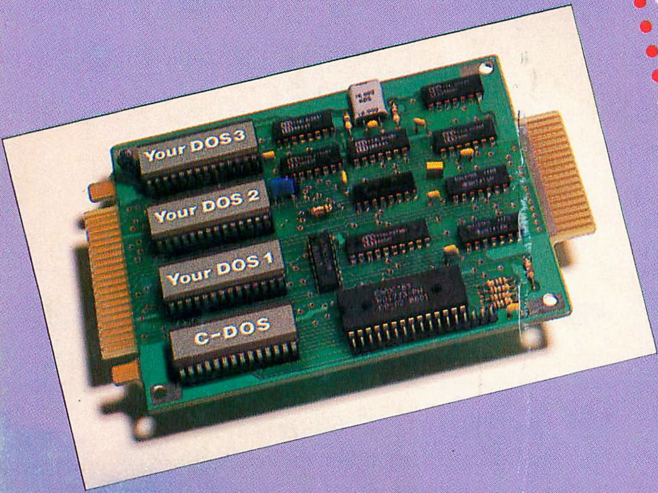

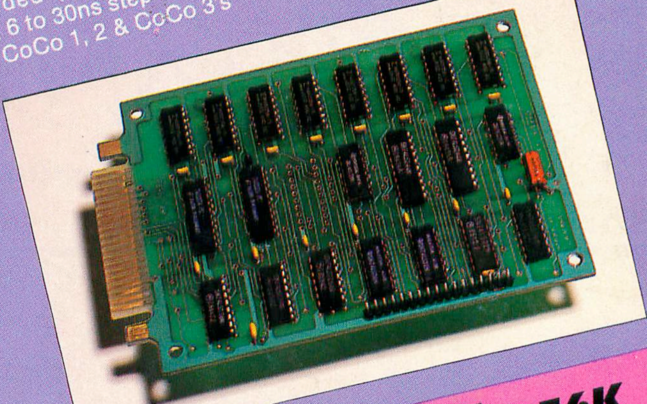

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